Appendix E

Pavement Condition Evaluation Reports

Explanation of Pavement Surface Conditions

Pavement Management in Kentucky

Department of Highways
Division of Operations
Pavement Condition Evaluation Form

Route:	Road Name:	Project Number	District	Date
KY0151	ALTON RD+GRAEFENBURG RD	FD05-003-0151-000-005	7	7/15/2014

From:	From:	County	# of Lanes	
0.000	US 127/US 127B	ANDERSON	2	2013 0-4.587 AC Overlay

To:	To:	State Aid	ADT	Speed
4.587	ANDERSON - FRANKLIN COUNTY LINE	SP	5633	55

Length:	Note: 2030
4.587	

Condition Survey

	Extent										Severity										Points
		Few			Intermediate				Extensive			Slight			Moderate				Severe		
Fatigue Cracking	0.0	0	1	2	3	4	5	6	7	8	9	0.0	0	1	2	3	4	5	6	7	8	9	0.0
Raveling	0.0	0		1		2		3		4	5	0.0	0		1		2		3		4	5	0.0
Other Cracking	0.0	0		1		2		3		4	5	0.0	0		1		2		3		4	5	0.0
Out of Section	0.0	0	0.5	1	1.5	2	2.5	3				0.0	0	0.5	1	1.5	2	2.5	3				0.0

Raters Collins Seasonal

( ) Clark ( ) Collins
( ) Garner ( ) Hill
( ) Lambert ( ) Mason
( ) Myatt ( ) Nowaczyk

Assessment Resurface Later

Improve ? ( ) This Year ( ) Next Year
( ) Later _____ ( ) Remove

How ? ( ) Resurface ( ) Inlay
( ) _____

Leveling and Wedging 20 % Recent Patching <5 %

☐ Mill _____

Appearance 0 0.5 1 1.5 2 2.5 3 — 0.0

Rideability (IRI) N/E 118 Adjustment 26 — Sub: 0.0

Rutting S/W 110 Adjusted IRI 92 — 12.0

<1/4"= 0
1/4" =3
5/16" =4.5
3/8" =6

7/16" = 7.5
1/2" = 9
9/16" = 10.5
5/8" = 12
>=3/4" = 15

N/E _____ — 0.0

S/W _____ Average _____

Roadway Features AC

AC PCC AC/PCC AC+AC/PCC

Curb & Gutter ☐ Manhole ☐ Inlet ☐

Shoulder - + ____ in. Width .5 ft ft.

Type AC
( ) AC ( ) Earth ( ) Gravel ( ) Concrete
( ) Chipseal ( ) _____

Haul ( ) Coal ( ) Logging ( ) Rock
( ) _____

Joint Separation	0.0
Grind	0.0
Total Points	12.0
Rank By Points	
Central Office Rank	
District Rank	

Notes: 2026

District Recommendation	Preparer	Cost Estimate $365,015.00

Treatment Codes

Preparation_____
Shoulders_____
Asphalt Surface _____
Surface, Base or Binder _____
Base or Binder _____

Remarks CO Estimate

Department of Highways
Division of Operations
Pavement Condition Evaluation Form

Route:	Road Name:	Project Number	District	Date
KY0151	KY HIGHWAY 151	FD05-037-0151-000-003	5	7/28/2014

From:	From:	County	# of Lanes	
0.000	ANDERSON - FRANKLIN COUNTY LINE	FRANKLIN	2	2014 0-3.224 AC Overlay

To:	To:	State Aid	ADT	Speed
2.411	.123 Before CRAB ORCHARD RD	SP	4873	55

Length:	Note:
2.411	update history water in joint 2012 overlay

Condition Survey

	Extent										Severity										Points
		Few			Intermediate				Extensive			Slight			Moderate				Severe		
Fatigue Cracking	0.0	0	1	2	3	4	5	6	7	8	9	0.0	0	1	2	3	4	5	6	7	8	9	0.0
Raveling	0.0	0		1		2		3		4	5	0.0	0		1		2		3		4	5	0.0
Other Cracking	0.0	0		1		2		3		4	5	0.0	0		1		2		3		4	5	0.0
Out of Section	2.5	0	0.5	1	1.5	2	2.5	3				1.0	0	0.5	1	1.5	2	2.5	3				3.5

Raters Nowaczyk Watson

( ) Clark ( ) Collins
( ) Garner ( ) Hill
( ) Lambert ( ) Mason
( ) Myatt ( ) Nowaczyk

Assessment Resurface Later

Improve ? ( ) This Year ( ) Next Year
( ) Later _____ ( ) Remove

How ? ( ) Resurface ( ) Inlay
( ) _____

Leveling and Wedging 20 % Recent Patching <5 %

☐ Mill _____

Appearance 0 0.5 1 1.5 2 2.5 3 — 0.0

Rideability (IRI) N/E 112 Adjustment 26 — Sub: 3.5

Rutting S/W 110 Adjusted IRI 86 — 10.0

<1/4"= 0
1/4" =3
5/16" =4.5
3/8" =6

7/16" = 7.5
1/2" = 9
9/16" = 10.5
5/8" = 12
>=3/4" = 15

N/E _____ — 0.0

S/W _____ Average _____

Roadway Features AC

AC PCC AC/PCC AC+AC/PCC

Curb & Gutter ☐ Manhole ☐ Inlet ☐

Shoulder - + ____ in. Width 4 ft.

Type AC
( ) AC ( ) Earth ( ) Gravel ( ) Concrete
( ) Chipseal ( ) _____

Haul ( ) Coal ( ) Logging ( ) Rock
( ) _____

Joint Separation	0.0
Grind	0.0
Total Points	13.5
Rank By Points	
Central Office Rank	
District Rank	

Notes: 2025

District Recommendation	Preparer	Cost Estimate

Treatment Codes

Preparation_____
Shoulders_____
Asphalt Surface _____
Surface, Base or Binder _____
Base or Binder _____

Remarks 2012 overlay

Explanation of Pavement Surface Conditions

Fatigue Cracking: Load related cracks predominately parallel to the pavement centerline are classified as fatigue cracking. Cracks associated with the beginning of alligator cracking are generally discontinuous, broken, and occur in the wheel path.

Raveling: Raveling is the wearing away of the pavement surface caused by dislodging of aggregate particles and loss of asphalt binder. Raveling ranges from loss of fines to loss of some coarse aggregate and ultimately to a very rough and pitted surface with obvious loss of aggregate.

Other Cracking: Other cracking includes age related, non-load cracking. These cracks can run roughly perpendicular to the roadway center line. Joint reflective cracking from overlaid rigid pavements within the lane should be evaluated as other cracking. Longitudinal cracks near the lane edges that are commonly associated with paving construction joints are also included.

Out of Section: Out of section is considered only for resurfacing program evaluations. Areas that are outside of the typical section are localized depressions or elevated areas of pavement that result from settlement, pavement shoving, or displacement.

Joint Separation: Longitudinal cracks near the lane edges that are commonly associated with paving construction joints.

Ride Quality: A primary objective for ride quality testing is to gather information about the pavement that is sufficient to estimate the satisfaction of the traveling public. The judgment of the public depends in a large part on the ride experienced.

The ride quality of Kentucky's pavements is measured by the International Roughness Index (IRI). The IRI is produced using a quarter-vehicle model and a measured longitudinal profile. Longitudinal profile measurements are made with laser profilers and on-board microprocessors that provide results at the time of testing and record data for later processing. IRI values for the left and right wheel paths are averaged to determine IRI values for the pavement.

Rutting:
KYTC uses a Laser Crack Measurement System which measures a 4000 point transverse rutting profile every 2 feet longitudinally. Rutting on Interstate and Parkway is now measured annually. Rutting on other pavements is measured on a two to three year cycle.

PAVEMENT MANAGEMENT IN KENTUCKY

An Overview in Year 2014

Operations and Pavement Management Branch
Division of Maintenance
Department of Highways
Kentucky Transportation Cabinet

November, 2014
Revised from September, 2001

PAVEMENT MANAGEMENT IN KENTUCKY

ORGANIZATION OF THE OPERATIONS & PAVEMENT MANAGEMENT BRANCH

The responsibility for determining pavement needs on a statewide basis was originally assigned to the Pavement Branch within the Division of Maintenance in 1981. Shortly thereafter, the unit was moved to the State Highway Engineer's Office under the Assistant State Highway Engineer for Operations. In 1987, the unit was moved to the Division of Specialized Programs, which was composed of several staff functions. Then, in 1994 the unit became a branch of the Division of Operations (which later became the Division of Maintenance).

In 2001, the duties of the branch were expanded to include management of the KYTC Maintenance Rating Program and Operations Management Systems. The unit was subsequently renamed the Operations & Pavement Management Branch. Currently, the branch is staffed with five engineers, five technicians and an engineering assistant. Policies and procedures applicable to the Operations & Pavement Management Branch are included in the Maintenance Guidance Manual.

PURPOSE

To develop and maintain an ongoing list of pavement needs based on independent, objective evaluations of conditions and detailed pavement distress data; to collect and analyze data to assess maintenance performance across the state; and to provide support for asset management.

GOALS AND FUNCTIONS

The concept of service to the highway user has guided development of the pavement management program by focusing efforts on functions that have a clear impact on the highway users. Important pavement management functions are as follows:

- Measure ride quality of all pavements to assess general conditions and estimate current and anticipated improvement needs.
- Perform visual assessments of pavements in order to select and prioritize those in need of rehabilitation or restoration.
- Assess impacts and recommend changes in programs, practices, policies and specifications affecting condition and performance of pavements.
- Maintain pavement database information for effective communication and coordination of pavement related activities within the Department of Highways.
- Provide data, information, and results of analyses to other KYTC units and outside agencies whenever necessary.

GUIDING PRINCIPLES

In performing the functions of pavement management, it will occasionally be necessary to modify existing procedures to account for changing needs, conditions, personnel, and resources. When making such changes, the following principles should be adhered to:

- Condition of pavements is to be measured in the most objective manner possible with available technology and personnel.
- Pavement needs will be determined not only based on condition, but also traffic considerations. These considerations should be applied in a consistent manner across the state.
- Rather than allowing pavements to deteriorate until more expensive treatments are required, emphasis should be placed on maintaining pavements in good condition through preventive maintenance techniques.
- District recommendations should be considered when prioritizing individual projects – particularly regarding routes that are local in nature. Conversely, greater consideration should be given to central office recommendations for routes having regional, statewide, or national impact.
- Where applicable, standards for conducting tests and condition assessments should be adhered to and thoroughly documented.

MAJOR TASKS

Visual Evaluation of Pavements on MP System

Previously, each district was required to submit a list of MP road sections identified for resurfacing and a list of State Primary sections that required rehabilitation (any treatment beyond a typical resurfacing project). Operations & Pavement Management staff would then conduct visual evaluations of these sections in order to prioritize needs within each district and to determine appropriate treatments.

In 2007, KYTC began a preventive maintenance program in order to achieve a higher level of performance by focusing a portion of maintenance funds on low-cost treatments that extend the life of pavements. These treatments must be applied to pavements that are not yet significantly distressed. In order to identify potential candidates for such treatments, it is necessary to evaluate sections that are still relatively new. Since pavements submitted for resurfacing are generally not good candidates for preventive maintenance, it was necessary to make changes to the evaluation process.

Beginning with the 2007 evaluations, sections were still chosen from district submissions based on resurfacing needs. However, additional mileage was selected by Operations & Pavement Management staff to ensure that at least 1/3 of the entire MP system was evaluated. These additional sections had a wide range of pavement ages, thereby increasing the likelihood that viable preventive maintenance candidates could be identified. Furthermore, this process provides a method to isolate significantly deteriorated pavements that might not otherwise have been identified through the previous method.

Beginning with the 2009 evaluations, districts are provided a list of roads to be evaluated in the upcoming season. This list comprises approximately one-third of the entire MP system as well as 1/2 of all completed preventive maintenance treatments in each district.

Additionally, condition assessments for those pavements evaluated in each of the previous two years are provided along with estimated current condition scores. Estimates of current conditions will be based on models developed with data from the Pavement Management System. If district personnel feel that the estimated condition assessments for any previously evaluated sections is inaccurate, those sections can be added to the current year evaluation list upon request by the district.

MP routes with less than 375 ADT are excluded from this process and are to be prioritized for low volume road funding at the districts' discretion.

FD05 Resurfacing Program

Once the visual evaluations are completed, all MP sections are ranked according to year of recommended treatment and total condition points. This ranking includes sections evaluated in previous years. District personnel will then have the right to add up to five points to the total condition points of any sections they choose based on their own assessment of needs.

District personnel will then provide windshield cost estimates for all projects recommended for resurfacing in the current or upcoming year. These estimates will be used in the FD05 Budget Allocation Program in order to determine each district's FD05 allotment. The districts will also prepare detailed estimates for projects anticipated to actually be completed with available funds.FD04 Preventive Maintenance Program

FD04 Preventive Maintenance Program

Once the visual evaluations are completed, MP sections that meet the distress point criteria for preventive maintenance treatments are submitted to the Preventive Maintenance Alliance (PMA) for further review. Those projects are then ranked by the Preventive Maintenance Alliance according to condition points and a cost benefit analysis that includes district distribution and asphalt prices. This ranking includes sections evaluated in previous years. The Operations and Pavement Management Branch will approve final project selection.

District personnel will then provide detailed estimates for all projects anticipated to be completed with available funds.

Interstates and Parkway Evaluations

Each year, the Operations & Pavement Management Branch performs pavement condition evaluations and ride quality measurements on the entire interstate and parkway systems; and recommends pavement rehabilitation treatments and priority rankings. Results are published each year in "Condition of Pavements on Kentucky Highways – Interstate and Parkway Roads".

As with the MP system, preventive maintenance treatments are now being emphasized on the Interstate and Parkway system. However, since annual assessments were already being performed, no changes to the evaluation process were necessary in order to identify candidate projects.

Rideability of Other Roads

All state-maintained road sections greater than 0.25 miles in length are tested for ride quality by Operations & Pavement Management on a two year cycle. Conditions are reported annually in "Condition of Pavements on Kentucky Highways – MP and RS Roads".

If staffing or equipment limitations do not allow for coverage of all roads, Interstate routes will be given top priority, followed by Parkway, State Primary, State Secondary, Supplemental, and Rural Secondary routes.

Ride Quality Requirements

New construction and other contract maintenance projects with ride quality specifications are tested by Operations & Pavement Management staff upon request by the resident engineer for the project. Results are reported to the Division of Construction so that bonus pay, penalties, or corrective work can be applied.

Six-Year Plan

In odd numbered years, the Division of Maintenance works with the Division of Highway Design to prepare lists of recommended pavement rehabilitation for Interstate, Parkway and State Primary roads to be included in the next six-year plan. The list is priority ranked and includes recommended treatment, cost estimate, and recommended year for the work to be done. Once the plan has been approved, the list is updated and distributed.

Highway Performance Monitoring Study (HPMS)

In even-numbered years, Operations & Pavement Management staff collects ride quality test data for the Division of Planning for submission to the Federal Highway Administration as a part of the KYTC reporting to Congress on the condition and performance of the nation's highway system.

Photolog Image Collection

As part of the Cabinet's efforts to move toward a more comprehensive asset management program, photolog images of the road and right of way are being collected in conjunction with rideability data. Current staffing and equipment availability will allow this data to be collected on a two year cycle. Certain low-volume roads may be excluded from this process due to the physical constraints of the data collection vehicle.

GOALS FOR MAJOR TASKS

Visual Evaluation of Pavements on MP System

Send information regarding previous year condition evaluations and planned evaluation list to districts by March 15 each year. Districts should respond with list of additional resurfacing evaluation requests by April 15 and preventive maintenance considerations by April 30.

Evaluations should begin in May of each year, and will be completed so that data is available to the districts by September 1. Districts should prepare windshield cost estimates of all projects recommended for resurfacing in the current or upcoming year. These estimates should be returned to the Operations & Pavement Management Branch by October 31. Projects recommended for preventive maintenance should be returned by November 15.

Detailed estimates for projects expected to be completed in upcoming year will be due from districts in one-third increments each month beginning October 15th. All detailed estimates for upcoming projects must be submitted to Roadway Preservation Branch by December 15th.

At least 99% of all MP pavement sections greater than 0.25 miles in length and 375 ADT will be evaluated at least once every three years. Exceptions will be made for pavements under construction or that are inaccessible due to unforseen circumstances (rock slide, flooding, etc).

Interstates and Parkway Evaluations

Ride quality testing will be completed by September 30.

Pavement condition evaluations will be completed by April 30.

Condition of Pavements data will be prepared and made available by January 31.

At least 98% of all Interstate and Parkway lane miles will be tested annually. Exceptions will be made for pavements under construction or that are inaccessible due to unforseen circumstances (rock slide, flooding, etc).

Rideability of Other Roads

At least 98% of National Highway System roadway miles will be tested for ride quality by December 1 of each year. Other roadway miles will be tested for ride quality on a two year cycle with at least 45% complete by December 1 of each year. Exceptions will be made for pavements under construction or that are inaccessible due to unforseen circumstances (rock slide, flooding, etc).

All pavement sections will be updated for milepoint termini, system change, resurfacing date, and traffic volumes by February 15.

Condition of Pavements report will be prepared and distributed by May 15.

Ride Quality Requirements

Each project will be tested and reported within two weeks of receiving the request for testing. A good-faith effort will be made to accommodate the schedule of contractors when projects must be opened to traffic.

Six-Year Plan

Tabulation of recommended pavement rehabilitation work will be completed by June 30 of odd numbered years. Tabulation of pavements approved for rehabilitation will be completed and distributed by June 30 of even numbered years.

Highway Performance Monitoring Study (HPMS)

Sections will be tested and data made available by April 15 of odd numbered years.

Photolog Image Collection

An initial inventory of images for the majority of state maintained roads was completed in 2013. Moving forward, the goals are to collect the National Highway System annually and all other state maintained roads on a two year cycle.

TEST METHODS AND PROCEDURES

RIDE QUALITY

The purpose of a pavement is to provide a surface for vehicles to run over at appropriate speeds. A primary objective for ride quality testing is to gather information about the pavement that is sufficient to estimate the satisfaction of the traveling public. The judgment of the public depends in a large part on the ride experienced.

Beginning in the 1960's, the ride quality of Kentucky's pavements was reported in terms of Rideability Index (RI), which ranges from zero to five. In 2003, RI was replaced with the more commonly used International Roughness Index (IRI) (ASTM E-1926).

The IRI is produced using a quarter-vehicle model and a measured longitudinal profile. Longitudinal profile measurements are made with laser profilers (ASTM E950) and on-board microprocessors that provide results at the time of testing and record data for later processing. The quarter-car model is complete with the basic parameters necessary to describe an automobile. IRI values for the left and right wheelpaths are averaged to determine IRI values for the pavement.

Currently the branch has three vehicles capable of capturing the longitudinal profile, rutting, faulting, and photolog images of the road and right of way.

RUTTING

Previously, ruts on Interstates and Parkways were measured annually using a 5-point laser profiler. Equipment problems eliminated this source of data beginning in 2004. Beginning in 2009, continuing through 2013, the Cabinet began measuring rutting using a 1200 point transverse profile. Starting in 2013, the Cabinet moved to a Laser Crack Measurement System which measures a 4000 point transverse rutting profile every 2 feet longitudinally. Rutting on Interstate and Parkway is now measured annually. Rutting on other pavements is measured on a two to three year cycle.

CONDITION EVALUATION - FLEXIBLE PAVEMENTS

Fatigue Cracking

Description

Load related cracks predominately parallel to the pavement centerline are classified as fatigue cracking. Cracks associated with the beginning of alligator cracking are generally discontinuous, broken, and occur in the wheel path.

Note

Sealed cracks where the sealant remains in good condition should be rated as slight severity cracking. If the sealant is showing distress the original crack severity should be rated.

Extent

Few **0-3 Points**
Less than 20% of potential cracking areas show distress
Use a maximum of four potential cracking areas per section

Intermediate **4-6 Points**
20% - 50% of potential cracking areas show distress
Use a maximum of four potential cracking areas per section

Extensive **7-9 Points**
Greater than 50% of potential cracking areas show distress
Use a maximum of four potential cracking areas per section
Max allowable percentage of potential cracking areas that show distress is 75%

Severity

Slight **0-3 Points**
Cracks are less than ¼" in width
No adjacent hairline cracking

Moderate **4-6 Points**
Cracks are about ¼" in width
May have light spalling
Random adjacent cracking
Early stages of alligator cracking may be forming

Severe **7-9 Points**
Cracks are greater than 3/8" in width
Edges are severely spalled
Significant adjacent cracking progressed into alligator cracking
Potholes are possible

Raveling

Description

Raveling is the wearing away of the pavement surface caused by dislodging of aggregate particles and loss of asphalt binder. Raveling ranges from loss of fines to loss of some coarse aggregate and ultimately to a very rough and pitted surface with obvious loss of aggregate.

Extent

Few **0-1 Points**
½ or more of the section shows slight raveling –or-
1/3 or more of the section has a combination of slight and moderate raveling
No severe raveling is present

Intermediate **2-3 Points**
½ or more of the section shows moderate distress –or-
1/3 or more of the section has a combination including severe raveling

Extensive **4-5 Points**
1/3 or more of the section shows severe raveling

Severity

Slight **0-1 Points**
Slight loss of aggregate or binder
Small amounts of pitting
Pavement appears slightly aged or rough

Moderate **2-3 Points**
Fine aggregate partially missing
Pitting is evident
Pavement appears moderately rough and loose particles may be present

Severe **4-5 Points**
Aggregate and binder have worn away significantly
Pavement appears deeply pitted and very rough

Other Cracking

Description

Other cracking includes age related, non-load cracking. These cracks can run roughly perpendicular to the roadway center line. Joint reflective cracking from overlaid rigid pavements within the lane should be evaluated as other cracking. Longitudinal cracks near the lane edges that are commonly associated with paving construction joints are also included.

Note

Sealed cracks where the sealant remains in good condition should be rated as slight severity cracking. If the sealant is showing distress the original crack severity should be rated.

Extent

Few **0-1 Points**
Transverse cracks are spaced at 150'
Less than 20% of the section length shows longitudinal cracking

Intermediate **2-3 Points**
Transverse cracks are spaced at 50'
20% - 50% of the section length shows longitudinal cracking

Extensive **4-5 Points**
Transverse cracks are spaced closer than 50' but not less than 25'
Greater than 50% of the section length shows longitudinal cracking
Max allowable percentage of section length with longitudinal cracking is 75%

Note

If both transverse and longitudinal cracks are present add extent points.

Severity

Slight **0-1 Points**
Cracks are less than ¼" in width

Moderate **2-3 Points**
Cracks are ¼" to ½" wide
There may be slight secondary cracking
Edges may be spalled

Severe **4-5 Points**
Cracks are greater than ½"
Significant secondary cracking is present
Edges are severely spalled

Out of Section

Note

Out of section is considered only for resurfacing program evaluations.

Description

Areas that are outside of the typical section are localized depressions or elevated areas of pavement that result from settlement, pavement shoving, or displacement.

Extent

Few **0-1 Points**
Less than two localized sections per mile

Intermediate **1.5-2 Points**
Two to four localized sections per mile

Extensive **2.5-3 Points**
More than four localized sections per mile

Severity

Slight **0-1 Points**
Noticeable effect on ride

Moderate **1.5-2 Points**
Some discomfort

Severe **2.5-3 Points**
Poor ride
Safety is a concern at maintained speed limit

Patching

Note
Patching is considered only for interstate and parkway evaluations.

Description
Patches are portions of the pavement surface that has been removed and replaced or additional material applied to the pavement after original construction.

Extent

Few **0-1 Points**
Less than 4 pothole patches and/or cutouts per mile
Machine patching is present on less than 5% of the section area

Intermediate **1.5-2 Points**
4-7 pothole patches and/or cutouts per mile
Machine patching is present on 5% - 15% of the section area

Extensive **2.5-3 Points**
8-10 pothole patches and/ore cutouts per mile
Machine patching is present on more than 15% of the section area
Max allowable percentage of section area with machine patching is 25%

Note
If both pothole patching/cutouts and machine patching are present add extent points.

Severity

Slight **0-1 Points**
Patch has nearly straight edges, rough texture, and surface contours which mimic the surface around the patch

Moderate **1.5-2 Points**
Patch has edges shaped to contours of surrounding pavement and is of variable thickness with feathered edges

Severe **2.5-3 Points**
Patch has loss of material and is settled

Patching

Note
Patching is considered only for interstate and parkway evaluations.

Description
Patches are portions of the pavement surface that has been removed and replaced or additional material applied to the pavement after original construction.

Extent

Few **0-1 Points**
Less than 4 pothole patches and/or cutouts per mile
Machine patching is present on less than 5% of the section area

Intermediate **1.5-2 Points**
4-7 pothole patches and/or cutouts per mile
Machine patching is present on 5% - 15% of the section area

Extensive **2.5-3 Points**
8-10 pothole patches and/ore cutouts per mile
Machine patching is present on more than 15% of the section area
Max allowable percentage of section area with machine patching is 25%

Note
If both pothole patching/cutouts and machine patching are present add extent points.

Severity

Slight **0-1 Points**
Patch has nearly straight edges, rough texture, and surface contours which mimic the surface around the patch

Moderate **1.5-2 Points**
Patch has edges shaped to contours of surrounding pavement and is of variable thickness with feathered edges

Severe **2.5-3 Points**
Patch has loss of material and is settled

Joint Separation

Description

Longitudinal cracks near the lane edges that are commonly associated with paving construction joints.

Note

Sealed cracks where the sealant remains in good condition should be rated as slight severity cracking. If the sealant is showing distress, the original crack severity should be rated.

Extent

Few **0 Points**
Less than 20% of the section length shows longitudinal cracking.

Intermediate - Extensive **Rate Severity**
Greater than 20% of the section length shows longitudinal cracking.

Severity

Slight **0-1 Points**
Cracks are less than ¼" in width.

Moderate **2-3 Points**
Cracks are ¼" to ½" wide.
There may be slight secondary cracking.
Edges may be spalled.

Severe **4-5 Points**
Cracks are greater than ½".
¾" is the max allowable crack width.
Significant secondary cracking is present.
Edges are severely spalled.

CONDITION EVALUATION - CONCRETE PAVEMENTS

Joint Deterioration

Definition

Joint deterioration refers to spalling that occurs when fragments break off along the edges of the pavement joints or cracks. Joints that have bituminous patches are also considered as spall.

Extent

Few **0-3 Points**
Less than 20% of panels

Intermediate **4-6 Points**
20% - 40% of panels

Extensive **7-9 Points**
Greater than 40% of panels
75% of panels is maximum allowable

Severity

Slight **0-3 Points**
Spalling occurs a minimum of 2" from the edge of the joint for a continuous length of less than 1'along the joint
Joint sealant is in good condition
Joints that have bituminous patches for less than 1'
D cracking and/or corner breaks are tight with no loose pieces

Moderate **4-6 Points**
Spalling occurs a minimum of 2" from the edge of the joint for a continuous length of 1' – 3' along the joint
Joint sealant is beginning to come apart
Joints that have bituminous patches for 1' – 3'
D cracking and/or corner breaks are well defined with small loose pieces

Severe **7-9 Points**
Spalling occurs a minimum of 3" from the edge of the joint for a continuous length of greater than 3' along the joint
Joint sealant is in poor condition
Joints that have more than 3' of bituminous patching
D cracking and/or corner breaks have developed into a pattern with significant amounts of loose material

Faulting

Description

Faulting is a difference in elevation across a joint or crack. Generally, faulting is found as a "step" across a transverse joint in the direction of travel.

Extent

Few **0-1 Points**
Less than 20% of panels

Intermediate **2-3 Points**
20% - 40% of panels

Extensive **4-5 Points**
Greater than 40% of panels
75% of panels is maximum allowable

Severity

Slight **0-1 Points**
Less than ¼" settlement at joints

Moderate **2-3 Points**
¼" to ½" settlement at joints

Severe **4-5 Points**
Greater than ½" settlement at joints
¾" is the max allowable settlement at joints

Other Cracking

Description
Other cracking includes breaks that may form transversely or longitudinally within the panel.

Extent

Few **0-1 Points**
Less than 20% of panels

Intermediate **2-3 Points**
20% - 40% of panels

Extensive **4-5 Points**
Greater than 40% of panels
75% of panels is maximum allowable

Severity

Slight **0-1 Points**
1 crack per panel

Moderate **2-3 Points**
2 to 3 cracks per panel

Severe **4-5 Points**
4 or more cracks per panel

Patching

Description

Patches are portions of the pavement surface that has been removed and replaced or additional material applied to the pavement after original construction.

Note

Do not include bituminous patching of joints in the patching evaluation.

Extent

Few	**0-1 Points**
Intermediate	**1.5-2 Points**
Extensive	**2.5-3 Points**

Severity

Slight **0-1 Points**

Patch has nearly straight edges, rough texture, and surface contours which mimic the surface around the patch

Moderate **1.5-2 Points**

Patch has edges shaped to contours of surrounding pavement and is of variable thickness with feathered edges

Severe **2.5-3 Points**

Patch has loss of material and is settled

DEMERIT POINTS FOR IRI AND ADJUSTMENTS FOR TRAFFIC VOLUMES

Ride quality values (IRI) are adjusted for traffic volume levels (vehicles per day) as detailed in **Table 1**. IRI demerit points vary from 0 to 38 and are assigned based on the Adjusted IRI (**Table 2**) where:

Adjusted IRI = IRI (measured) – IRI Adjustment (from Table 1)

Traffic Volume (ADT) Range		IRI Adjustment
2 – lane	4 – lane	
> 12,000	> 16,100	0
10,001 – 12,000	12,651 – 16,100	6
8,001 – 10,000	9,601 – 12,650	13
6,001 – 8,000	6,901 – 9,600	19
4,001 – 6,000	4,401 – 4,900	26
2,001 – 4,000	2,151 – 4,400	32
1,501 – 2,000	1,601 – 2,150	38
1,001 – 1,500	1,051 – 1,600	45
801 – 1,000	826 – 1,050	51
601 – 800	611 – 825	58
401 – 600	401 – 610	64
201 – 400	201 – 400	70
<200	<200	77

TABLE 2. DEMERIT POINTS FOR ADJUSTED IRI

Adjusted IRI	Demerit Pts	Adjusted IRI	Demerit Pts	Adjusted IRI	Demerit Pts
≤ 53	0	94 – 96	13	135 – 138	26
54 – 57	1	97 – 99	14	139 - 141	27
58 – 61	2	100 – 102	15	142 – 144	28
62 – 64	3	103 – 106	16	145 – 148	29
65 – 67	4	107 – 109	17	149 – 151	30
68 – 70	5	110 – 112	18	152 – 154	31
71 – 74	6	113 – 115	19	155 – 157	32
75 – 77	7	116 – 118	20	158 – 160	33
78 – 80	8	119 – 122	21	161 – 163	34
81 – 83	9	123 – 125	22	164 – 167	35
84 – 86	10	126 – 128	23	168 – 170	36
87 – 90	11	129 – 131	24	171- 173	37
91 – 93	12	132 – 134	25	> 174	38

SKID RESISTANCE

District Traffic personnel will serve as the primary contact for requests involving pavement slickness. In order to minimize the number of unnecessary skid tests, the initial investigation should rule out other potential contributing factors to wet pavement crashes such as rutting, ponding of water, high shoulders, and other drainage issues. District Project Delivery & Preservation personnel should be contacted to assist in evaluating these concerns. Other contributing factors may include poor visibility, signing, geometry, etc. If skid resistance is considered the likely problem upon completion of the initial investigation, testing should be requested.

The Chief District Engineer for the District will submit a request for skid testing directly to the Division of Materials. A copy of this request (along with supporting documentation) should be sent to Central Office Traffic Operations. Skid resistance measurements are made by the Division of Materials using a pavement friction tester in accordance with ASTM E-274. The measurement is expressed as skid number (SN), and the scale ranges from 0 to 100. Tests are made in the left wheel path of each lane at 0.5 mile intervals. Test results will be forwarded to the Divisions of Traffic Operations, Maintenance, and the District Traffic Branch Manager.

The following actions will be necessary based on the results of the skid test:

Skid Number	Action
39 or Greater	No further action is necessary
27 to 38	Section will be incorporated into the resurfacing program evaluation process with demerit points assigned for friction. These pavements should continue to be tested on a regular schedule until treatment is applied. Slippery When Wet signage would be recommended for pavements in this range.
26 or Below	Improvement should be given a high priority. Alternative treatments and funding sources should be considered if the pavement is not a good candidate for resurfacing. Slippery When Wet signage would be recommended for pavements in this range.

The Operations and Pavement Management Branch does not administer Skid Resistance testing or remediation efforts. When tests are performed as outlined above and provided to the Division of Maintenance, skid numbers will be used in conjunction with visual assessments to assign demerit points as outlined in **Table 3.**

TABLE 3. DEMERIT POINTS FOR SKID NUMBER	
SN	**Demerit Pts**
38	1
37	2
36	3
35	4
34	5
33	6
32	7
31	8
30	9
29	10
28	11
27 or less	12

PAVEMENT CONDITION ASSESSMENT FOR GASB-34 REPORTING

Pavements shall be assessed on an annual basis for the purposes of reporting the state's condition of assets. No more than 30% of pavements shall be in poor condition. Determining pavement condition is a two-step process.

First, recommended treatment years are defined through the visual assessment processes previously described. Pavements that have been determined to be in need of resurfacing (for asphalt pavements) or diamond grinding (for concrete pavements) within one year shall be rated in poor condition. Pavements determined to need such treatment within 2-4 years shall be rated in fair condition. All other pavements shall be rated in good condition.

The second step of the condition analysis requires that each pavement be rated according to traffic volume and roughness as defined in **Table 4**. This step may result in a decline of assessed condition for pavements previously rated in step 1. However, this step cannot result in a condition assessment that is better than what was defined based on visual assessments. Where visual assessments are not available, condition will be determined solely by evaluation of the most recent IRI and traffic volume data.

TABLE 4. CONDITION ASSESSMENTS BASED ON IRI AND TRAFFIC VOLUME

ADT	POOR CONDITION	FAIR CONDITION	GOOD CONDITION
Above 12000	130 or higher	98 – 129	97 or lower
10001-12000	136 or higher	102 – 135	103 or lower
8001-10000	143 or higher	111 – 142	110 or lower
6001-8000	149 or higher	117 – 148	116 or lower
4001-6000	155 or higher	124 – 154	123 or lower
2001-4000	162 or higher	130 – 161	129 or lower
1501-2000	168 or higher	136 – 167	135 or lower
1001-1500	175 or higher	143 – 174	142 or lower
801-1000	181 or higher	149 – 180	148 or lower
601-800	188 or higher	156 – 187	155 or lower
401-600	194 or higher	162 – 193	161 or lower
201-400	200 or higher	168 – 199	167 or lower
1-200	207 or higher	175 – 206	174 or lower

YEARLY DECREASE IN RIDE QUALITY

For Interstate and Parkway pavements, condition (demerit) points are given for increases in IRI value from the previous year according to the following equation:

Points = IRI Increase / 6.4

ANNUAL DETERIORATION OF MP PAVEMENTS

MP pavements evaluated in previous years will receive additional deterioration points based on the year of last evaluation. As more data becomes available, annual deterioration points may be refined based on district, traffic volume, pavement design or other factors.

Deterioration Points = 2 * (Current Year – Year of Last Evaluation)

RUTTING

Condition (demerit) points for ruts vary from 0 to 15 as follows:

Ruts	**Demerit Points**
<1/4”	0
1/4”	3
3/8”	6
1/2”	9
5/8”	12
3/4” or more	15

PAVEMENT MANAGEMENT FUNDING SOURCES

Pavement Management Treatments can be broadly grouped into the three major categories below:

- **Rehabilitation/Reconstruction** treatments consist of those which address underlying structural deficiencies in pavements that are significantly deteriorated.

- **Preservation** treatments prolong the life of pavements by reducing their rate of deterioration but do not add structural capacity.

- **Reactive Maintenance** treatments are meant to restore serviceability in instances of sudden or catastrophic defects, but do not prolong pavement life or add structural capacity.

An effective pavement management program must ensure a balance between these three major categories of treatments. Sufficient funding is not available to focus solely on the rehabilitation or reconstruction of pavements in poor condition; nor is it acceptable to simply perform reactive maintenance while never addressing structural issues. Consequently, separate sources of funding must be maintained which ensure an equitable distribution of treatments across these categories. Table X illustrates the state funding sources available for various pavement management treatment types.

Funding Source	Description	Treatment Categories
FE01	Roadway Maintenance	Reactive Maintenance and Preservation
FD05	Statewide Resurfacing	Preservation (limited to MP pavements)
FD04	State Fund Projects (SP)	Rehabilitation/Reconstruction/ Preventive Maintenance
FD39	Contingency Projects	Any (per approval by Secretary of Transportation)
FD52	Federal Funding State Match	Any (limited to Federal Aid System)
CB06	Rural Secondary Construction	Any (limited to Rural Secondary roads)

It is imperative that funding sources be reserved for the appropriate treatment categories. Use of preservation funding for major rehabilitation or reconstruction projects is unacceptable and will ultimately lead to a larger percentage of pavements in poor condition.

PAVEMENT MANAGEMENT TREATMENT DEFINITIONS

Within the broad categories of treatments there are more narrowly defined classes of treatment types. Following is a list of treatment types as defined by the Federal Highway Administration (FHWA). *Source:* http://www.fhwa.dot.gov/pavement/preservation/091205.cfm

REHABILITATION/RECONSTRUCTION

Major rehabilitation "consists of structural enhancements that both extend the service life of an existing pavement and/or improve its load-carrying capability."

Pavement Reconstruction is the replacement of the entire existing pavement structure by the placement of the equivalent or increased pavement structure. Reconstruction usually requires the complete removal and replacement of the existing pavement structure. Reconstruction may utilize either new or recycled materials incorporated into the materials used for the reconstruction of the complete pavement section. Reconstruction is required when a pavement has either failed or has become functionally obsolete.

PRESERVATION

Minor rehabilitation consists of non-structural enhancements made to the existing pavement sections to eliminate age-related, top-down surface cracking that develop in flexible pavements due to environmental exposure. Because of the non-structural nature of minor rehabilitation techniques, these types of rehabilitation techniques are placed in the category of pavement preservation.

Preventive Maintenance is "a planned strategy of cost-effective treatments to an existing roadway system and its appurtenances that preserves the system, retards future deterioration, and maintains or improves the functional condition of the system (without significantly increasing the structural capacity)."

Preventive maintenance is typically applied to pavements in good condition having significant remaining service life. As a major component of pavement preservation, preventive maintenance is a strategy of extending the service life by applying cost-effective treatments to the surface or near-surface of structurally sound pavements. Examples of preventive treatments include asphalt crack sealing, chip sealing, slurry or micro-surfacing, thin and ultra-thin hot-mix asphalt overlay, concrete joint sealing, diamond grinding, dowel-bar retrofit, and isolated, partial and/or full-depth concrete repairs to restore functionality of the slab; e.g., edge spalls, or corner breaks.

Routine Maintenance "consists of work that is planned and performed on a routine basis to maintain and preserve the condition of the highway system or to respond to specific conditions and events that restore the highway system to an adequate level of service."

Routine maintenance consists of day-to-day activities that are scheduled by maintenance personnel to maintain and preserve the condition of the highway system at a satisfactory level of service. Examples of pavement-related routine maintenance activities include cleaning of roadside ditches and structures, maintenance of pavement markings and crack filling, pothole patching and isolated overlays. Crack filling is another routine maintenance activity which consists of placing a generally, bituminous material into "non-working" cracks to substantially reduce water infiltration and reinforce adjacent top-down cracks. Depending on the timing of application, the nature of the distress, and the type of activity, certain routine maintenance activities may be classified as preservation. Routine Maintenance activities are often "in-house" or agency-performed and are not normally eligible for Federal-aid funding.

REACTIVE MAINTENANCE

Corrective Maintenance activities are performed in response to the development of a deficiency or deficiencies that negatively impact the safe, efficient operations of the facility and future integrity of the pavement section. Corrective maintenance activities are generally reactive, not proactive, and performed to restore a pavement to an acceptable level of service due to unforeseen conditions. Activities such as pothole repair, patching of localized pavement deterioration, e.g. edge failures and/or grade separations along the shoulders, are considered examples of corrective maintenance of flexible pavements. Examples for rigid pavements might consist of joint replacement or full width and depth slab replacement at isolated locations.

Catastrophic Maintenance describes work activities generally necessary to return a roadway facility back to a minimum level of service while a permanent restoration is being designed and scheduled. Examples of situations requiring catastrophic pavement maintenance activities include concrete pavement blow-ups, road washouts, avalanches, or rockslides.

STATEWIDE RESURFACING PROGRAM

OVERVIEW

The FD05 Statewide Resurfacing Program is administered through the Operations & Pavement Management Branch within the Division of Maintenance. Pavements are evaluated on a three-year cycle as outlined previously under "Major Tasks – Visual Evaluation of Pavements on MP System". The year of recommended resurfacing is defined during the evaluation and is based on the engineer's assessment of overall condition, rate of deterioration, and traffic loads.

Pavements are grouped according to their recommended year of resurfacing and are ranked according to overall condition. District personnel are consulted regarding possible adjustments to the recommended treatment year based on anticipated conflicts with construction, utility, or other projects. Also, district personnel may add up to five distress points to any pavement section in order to adjust its ranking on the list.

PROJECT VIABILITY

When evaluating pavement sections, engineers must determine if resurfacing is a viable treatment option based on pavement condition. Current practice for resurfacing AC pavements involves leveling and wedging and the application of a 1" or 1.25" bituminous surface course. A 1.5" surface course may be used where aggregate availability dictates or conditions warrant. Structurally adequate pavements rutted to a depth of 3/8" or more may be milled to minimize leveling and wedging requirements and to improve ride quality. Minimal repairs of base failures may also be allowed as part of a resurfacing project. However, structural improvements to pavements cannot be addressed through the FD05 resurfacing program. Such pavement distresses must be addressed with separate funding through a rehabilitation project.

In addition to milling, leveling and wedging, and surface course, other bid items may be required. These may include(but are not limited to) striping, raised pavement markers, accessible sidewalk ramps, traffic loops, thermoplastic markings, etc. Questions regarding specific items eligible for FD05 funding should be directed to the Central Office Division of Maintenance Roadway Preservation Branch.

FD05 BUDGET ALLOTMENT PROGRAM

Funding for FD05 projects is allocated to the highway districts on the basis of lane-miles of roads, cost of bituminous surface course materials, conditions of pavements, and estimated project costs within each district. The method for allocating funds has been in use since 1982 and was established in part to assure a competitive paving industry in all highway districts while also assuring that excessive allocations do not overburden the industry in any district.

Complete equalization in pavement conditions statewide is not sought because traffic loading, subgrade conditions, climate, terrain, etc. distinguishes one district from another and significantly affects pavement performance. The intent is to achieve more equal conditions over time without unduly straining the state's resources.

PREVENTIVE MAINTENANCE PROGRAM

OVERVIEW

Currently the Six Year Plan allows funding for preventive maintenance that is renewed on a year to year basis. Projects are evaluated through the normal process of visual assessment and in conjunction with input from district personnel. Additionally, districts are encouraged to identify preventive maintenance projects using Rural Secondary funding or district FE01 funding.

Following is a list of typical preventive maintenance treatments which may be considered, along with guidelines as to when each treatment would be most effective given current pavement conditions. These guidelines should provide a general framework from which engineers may make a decision as to the feasibility of a given treatment. However, circumstances may dictate that a specific treatment be included or excluded due to considerations not identified in these guidelines. Also, this list is not to be considered all-inclusive as other treatments may become available in the future which are not currently identified here.

Preventive Maintenance Alliance (PMA)

The Preventive Maintenance Alliance consists of maintenance personnel from the districts as well as from central office. The district is represented with one person from each branch of the twelve districts across the state. The central office is represented by the Operations and Pavement Management branch and a team member from each of the Divisions of Construction and Materials.

This alliance submits possible projects and verifies projects recommended by central office. The group meets annually to discuss project applications, performance, specifications, project and contractor reviews, and new products.

Routed Asphalt Crack Sealing

Crack sealing is the placement of a mixture of neat or modified binder mixed with polyester into existing cracks in the pavement.

Crack sealing prevents water and incompressibles from entering the pavement structure which slows the deterioration of moisture related distresses such as stripping, pumping of fines, and increased fatigue cracking.

Asphalt crack sealing is generally targeted to poor longitudinal construction joints or working cracks more than 1/8" but less than ½". Working cracks are defined as those that experience significant horizontal movements. Typical working cracks include: transverse thermal cracks, transverse reflective cracks, diagonal cracks, and working longitudinal cracks. Visible surface distresses should be fairly straight open longitudinal and transverse cracks with slight secondary cracking and slight raveling. Crack sealing is suitable for all traffic levels.

KYTC Pavement Management Evaluation Guidelines

Fatigue Cracking	Extent <= 5, Severity <= 3
Raveling	Total Score <= 5
Other Cracking	Extent and Severity both <=3
Joint Separation	Less than or equal to 3
Rutting	Less than or equal to 3/8"
Total Condition Points	Less than or equal to 30
Time to Next Overlay	Greater than or equal to 6 years

Overband Asphalt Crack Filling

The overband crack fill method involves blowing the crack clean with dried, compressed air and filling it with mixture of neat or modified binder mixed with polyester.

Crack filling prevents water from entering the pavement structure and reinforces the adjacent pavement

Asphalt crack filling is principally used for treating non-working cracks more than 1/8" but less than ½". Typical non-working cracks include: longitudinal reflective cracks, longitudinal cold joint cracks, longitudinal edge cracks, and distantly spaced block cracks. Visible surface distresses should be fairly straight open longitudinal and transverse cracks with slight secondary cracking and slight raveling at the crack face. Crack filling should not be used on longitudinal Fatigue cracking because of friction concerns. Crack filling is suitable for all traffic levels.

KYTC Pavement Management Evaluation Guidelines

Fatigue Cracking	Extent<=5, Severity <= 3
Raveling	Total Score <=5
Other Cracking	Extent and Severity both <=3
Joint Separation	Less than or equal to 3
Rutting	Less than or equal to 3/8"
Total Condition Points	Less than or equal to 30
Time to Next Overlay	Greater than or equal to 6 years

Fog Seal

A fog seal is a light application of diluted asphalt emulsion.

Fog seals are used to seal the small cracks, inhibit raveling, and provide some enrichment to a hardened and oxidized surface.

A fog seal is appropriate for aged or raveled pavements. Pavements that are not raveled will not adequately absorb the mixture, resulting in a slick surface. However, extremely raveled roads may be beyond the point where a fog seal is beneficial. Fog seals should not be used when cracking is extensive or for cracks greater than 1/8". Due to the time required before traffic is returned, fog seals should be excluded from higher ADT routes.

KYTC Pavement Management Evaluation Guidelines

Fatigue Cracking	Extent <= 5, Severity <= 3
Raveling	Total Score <= 8 and >= 4
Other Cracking	Total Score <= 3
Joint Separation	Less than or equal to 1
Rutting	Less than or equal to ¼"
Total Condition Points	Less than or equal to 30
ADT	Less than or equal to 1500
Time to Next Overlay	Greater than or equal to 6 years

Sand Seal

A sand seal is the application of asphalt emulsion followed by a thin layer of sand to seal small cracks and protect pavements.

A sand seal is used to retard oxidation of an existing pavement, improve skid resistance and seal pavement surfaces on low volume roads.

Sand seals should be applied to roadway sections with moderate longitudinal and transverse cracking, minor amounts of secondary cracking, slight raveling, and slight to moderate polishing. Due to the current lack of experience with sand seals, they should be used only on low volume roads and on asphalt surfaced shoulders.

KYTC Pavement Management Evaluation Guidelines

Fatigue Cracking	Extent <= 5, Severity <= 3
Raveling	Total Score <= 8 and >= 4
Other Cracking	Total Score <= 3
Joint Separation	Less than or equal to 1
Rutting	Less than or equal to ¼”
Total Condition Points	Less than or equal to 30
ADT	Less than or equal to 1500
Time to Next Overlay	Greater than or equal to 6 years

Scrub Seal

A scrub seal is the application of asphalt emulsion followed by the broom scrubbing of the asphalt into cracks and voids, then the application of an even coat of sand or small aggregate, and finally a second brooming of the aggregate and asphalt mixture.

The treatment is used to retard oxidation of an existing pavement, improve skid resistance and seal pavement surfaces on low volume roads.

Scrub seals should be applied to roadway sections with moderate longitudinal and transverse cracking, minor amounts of secondary cracking, slight raveling, and slight to moderate polishing. Due to the current lack of experience with scrub seals, they should be used only on low volume roads and on asphalt surfaced shoulders.

KYTC Pavement Management Evaluation Guidelines

Fatigue Cracking	Extent <= 5, Severity <= 3
Raveling	Total Score <= 8
Other Cracking	Total Score <= 4
Joint Separation	Less than or equal to 2
Rutting	Less than or equal to ¼”
Total Condition Points	Less than or equal to 30
ADT	Less than or equal to 150
Time to Next Overlay	Greater than or equal to 6 years

Slurry Seal

A slurry seal is a mixture of slow setting emulsified asphalt, well graded fine aggregate, mineral filler, and water.

A slurry seal used to fill cracks and seal areas of old pavements, restore a uniform surface texture, seal the surface against water and air intrusion, stop raveling, and to improve skid resistance.

A slurry seal is primarily used to fill non-working cracks in the pavement. Slurry seals should be applied to roadway sections with moderate longitudinal and transverse cracking, minor amounts of secondary cracking, slight raveling, and slight to moderate polishing. Due to the current lack of experience with slurry seals, they should be used only on low volume roads and on asphalt surfaced shoulders.

KYTC Pavement Management Evaluation Guidelines

Fatigue Cracking	Extent <= 5, Severity <= 3
Raveling	Total Score <= 8
Other Cracking	Total Score <= 5
Joint Separation	Less than or equal to 2
Rutting	Less than or equal to ¼”
Total Condition Points	Less than or equal to 30
ADT	Less than or equal to 1500
Time to Next Overlay	Greater than or equal to 6 years

Ultrathin Friction Course

An ultrathin friction course is a gap-graded, polymer modified HMA placed on a heavy, polymer modified emulsified asphalt tack coat.

An ultrathin friction course is a functional overlay that can be used to improve friction and ride, reduce raveling and noise, and seal small non-working cracks. The heavy tack coat also serves as a barrier for the intrusion of water into the pavement surface.

Ultrathin friction course should be used on roadway sections with moderate longitudinal and transverse cracking, minor surface irregularities, rutting less than ½", polished surface, and moderate raveling Ultrathin friction course is suitable for all traffic levels.

KYTC Pavement Management Evaluation Guidelines

Fatigue Cracking	Total Score <= 10
Raveling	Total Score <= 6
Other Cracking	Total Score <= 5
Joint Separation	Less than or equal to 3
Rutting	Less than or equal to ½"
Total Condition Points	Less than or equal to 35
Time to Next Overlay	Greater than or equal to 4 years and less than or equal to 8 years

Microsurfacing

Microsurfacing is a mixture of polymer-modified asphalt emulsion, mineral aggregate, mineral filler, water, and additives, properly proportioned, mixed, and spread on a paved surface.

A single course microsurfacing applied to a pavement will retard oxidization and improve skid resistance. A multiple-course microsurfacing application will correct certain pavement surface deficiencies including rutting, minor surface profile irregularities, polished aggregate or low skid resistance, and light to moderate raveling.

Microsurfacing should be used on roadway sections with moderate longitudinal and transverse cracking, rutting, minor surface irregularities, polished surface, and moderate raveling. Localized wheel path cracking or edge cracking should be repaired full depth. All existing cracks must be filled or sealed. Microsurfacing is suitable for all traffic levels.

KYTC Pavement Management Evaluation Guidelines

Fatigue Cracking	Total Score <= 10
Raveling	Total Score <= 6
Other Cracking	Total Score <= 5
Joint Separation	Less than or equal to 3
Total Condition Points	Less than or equal to 35
Time to Next Overlay	Greater than or equal to 4 years and less than or equal to 8 years

4B Ultrathin Overlay

A 4B ultrathin overlay is a plant-mixed combination of asphalt cement and aggregate applied to the pavement in thicknesses of 5/8”to ¾”.

A 4B ultrathin overlay is a functional overlay that can be used to improve friction and ride, reduce raveling and noise, and seal small non-working cracks.

A 4B ultrathin overlay should be used on roadway sections with moderate longitudinal and transverse cracking, minor surface irregularities, rutting less than ¼”, polished surface, and moderate raveling. Ultrathin overlays are suitable for all traffic levels. However, until there is a better understanding of its performance, ultrathin overlays should be limited to sections that are not expected to experience significant shear forces such as those caused by heavy trucks braking or turning onto the pavement.

KYTC Pavement Management Evaluation Guidelines

Fatigue Cracking	Extent <= 5, Severity <= 3
Raveling	Total Score <= 6
Other Cracking	Total Score <= 5
Joint Separation	Less than or equal to 3
Rutting	Less than or equal to ¼”
Total Condition Points	Less than or equal to 30
Time to Next Overlay	Greater than or equal to 4 years and less than or equal to 8 years

Chip and Seal

A chip and seal surface is a combination of a bituminous binder layer and a fine aggregate layer. The aggregate is rolled and embedded into the binder and followed by a thin fog seal for aggregate retention.

Chip and seal surfaces can be used to address moderate cracking and raveling and provides a highly skid resistant treatment.

A chip and seal application should be used on roadways with moderate longitudinal and transverse cracking, minor surface irregularities, and rutting less then ½". Chip and seal surfaces should be limited to low volume roadways.

KYTC Pavement Management Evaluation Guidelines

Fatigue Cracking	Extent <= 5, Severity <= 3
Raveling	Total Score <= 8
Other Cracking	Total Score <= 5
Joint Separation	Less than or equal to 3
Rutting	Less than or equal to ½ "
Total Condition Points	Less than or equal to 30
Time to Next Overlay	Greater than or equal to 4 years and less than or equal to 8 years

Cape Seal

A cape seal surface is the application of the chip seal followed by a thin overlay treatment. The chip seal provides a waterproof membrane and adds a reflective crack barrier for the top surface treatment.

A cape seal is functional overlay that can be used to improve friction and ride, reduce raveling and noise, and seal cracks. It extends life and is more durable than a single thin overlay.

A cape seal can be used on roadways with moderate to high distresses such as longitudinal cracking, transverse cracking and raveling. Cape seals are suitable for all traffic levels, however the chip seal layer requires a curing periods before final surface overlay is applied

KYTC Pavement Management Evaluation Guidelines

Use of the cape seal treatments may be used in place of resurfacing treatments

Diamond Grinding

Diamond grinding is a process that uses a series of diamond tipped saw blades mounted on a shaft or arbor to shave off the upper surface (about ¼") of a rigid pavement.

Diamond grinding benefits include improved ride quality, removal of joint and crack faults, removal of wheel ruts caused by studded tires, restoration of transverse drainage, and improvement of skid resistance.

Diamond grinding should be used on roadway sections with joint and crack faults on average not exceeding ¼", rut depths less than ¼", and moderate to severe polishing. Structural distress and drainage problems require repair before grinding is conducted. Diamond grinding is not recommended for pavements with significant slab cracking or severe durability distress, such as D-cracking, alkali-silica reactivity, or freeze-thaw damage. The effectiveness of diamond grinding may be limited if significant pumping or loss of support exists.

KYTC Pavement Management Evaluation Guidelines

Joint Deterioration	Extent <=l to 5, Severity <= 3
Faulting	Total Score <= 6
Other Cracking	Extent <= 4, Severity <= 3
IRI	Greater than 130
Remaining Service Life	Greater than or equal to 10 years

Concrete Crack Sealing

Concrete crack sealing involves sawing, cleaning and sealing of concrete pavement cracks that are longer than 3 feet and wider than 1/8". For cracks wider than 3/8", a backer rod must be used.

Concrete crack sealing is intended to prevent or reduce the ingress of moisture and incompressible material into cracks, thereby slowing deterioration.

Slowly deteriorating concrete pavements are appropriate for crack sealing. Crack sealing is commonly performed on working cracks that are wide enough to permit significant infiltration. The pavement should have a low severity level of longitudinal and transverse cracks that do not exhibit significant spalling. Crack sealing is not usually done on Continuous Reinforced Concrete Pavement.

KYTC Pavement Management Evaluation Guidelines

Joint Deterioration	Total Score <= 4
Faulting	Total Score <= 4
Other Cracking	Extent and Severity both <= 3
IRI	Less than or equal to 130
Remaining Service Life	Greater than or equal to 15 years

Concrete Joint Resealing

Concrete joint resealing includes the removal of existing deteriorated joint seals, and resealing the transverse and longitudinal joints with hot-poured rubber.

Concrete pavement joints are sealed to prevent water and incompressible materials from entering the pavement structure. An effective joint sealant system is expected to reduce moisture accelerated distresses (such as pumping and faulting) and pressure related distresses (joint spalling and blowups) that result when slabs are unable to expand into transverse joints filled with incompressible materials.

Resealing can be done where existing joint seals have failed. Joint faces must be in good condition with little or no spalling. Joints should not be open more than 1" at any temperature and joint widths should not vary by more than 1/8".

KYTC Pavement Management Evaluation Guidelines

Joint Deterioration	Total Score <= 5
Faulting	Total Score <= 2
Other Cracking	Extent and Severity both <= 3
IRI	Less than or equal to 130
Remaining Service Life	Greater than or equal to 15 years

Concrete Pavement Repair

Partial depth repair is used to repair localized areas of surface deterioration within the upper one-third of the slab depth. Full depth concrete pavement repair consists of the removal and replacement of the concrete pavement at the deteriorated joint or open crack

Concrete pavement will restore pavement structural integrity and should maintain its existing ride quality. Secondary benefits include reducing the quantity of water entering the pavement structure and slowing the rate of distress.

The concrete pavement should be in good condition and deteriorating slowly. Transverse joints and cracks to be repaired should show severe spalling over their length. Other transverse joints and cracks with openings wider than ¼" or faulting more than 1/8" are appropriate for repairs. Repairs should not be performed on concrete pavements exhibiting significant levels of deterioration. It is most applicable to pavements in which deterioration is limited to a few joints and cracks and deterioration is not widespread over the length of the project.

KYTC Pavement Management Evaluation Guidelines

Joint Deterioration	Extent <= 3, Severity >= 3
Other Cracking	Total Score <= 8
Remaining Service Life	Greater than or equal to 5 years

Policies on Applicability and Calculation of Ride Quality Adjustments

Ride Quality adjustments will be applied in accordance with the Kentucky Department of Highways Asphalt Pavement Rideability Requirement Guidelines – effective February 25, 2008. Section 1.0 of this policy is to be used to determine when rideability requirements shall be included on projects. If rideability is required, the category of project will also be determined as outlined in section 2.0 of the policy. These guideilines are to be used for both asphalt and concrete pavements.

As per State Highway Engineer Policy #2008-10, projects let in or following October, 2008 will not be eligible for incentive payments involving rideability. However, penalties for ride quality adjustments will still be applied in accordance with the Pay Adjustment Schedule outlined in the version of the Standard Specifications for Road and Bridge Construction which is in effect at the time the project is let.

When a project is awarded with a rideability note, sections of the project which would have otherwise been eligible for bonus payments will first be calculated in order to offset sections that would result in a penalty. If the resulting total bonus payments within a project exceeds the total penalties, then the net result will be an adjustment of $0.00. If total penalties exceed bonuses, then the net result will be an adjustment equal to total bonuses minus total penalties. To clarify – ride quality calculations for each project may result in a total negative adjustment, but will never result in a total positive adjustment.

KENTUCKY DEPARTMENT OF HIGHWAYS
ASPHALT PAVEMENT RIDEABILITY REQUIREMENT GUIDELINES

1.0 APPLICATION. Section 410, Asphalt Pavement Rideability, of the Standard Specifications for Road and Bridge Construction should apply when a project's length is 0.4 miles (0.64 kilometers) or greater and any of the following conditions exist:

1. New construction projects – regardless of posted speed limit.
2. Surfacing projects involving two or more asphalt courses on high-type facilities and a posted speed of 45 mph or greater.
3. Surfacing projects on facilities with a posted speed of 45 mph or greater where significant milling or other surface preparation makes rideability requirements feasible.

The Department may apply rideability on project types other than the above or waive the requirements when deemed necessary. The Department will include a statement in proposals when the rideability requirements of Section 410 apply.

2.0 CATEGORY. Once a determination has been made that rideability requirements will be applied, the Department will establish the Pay Adjustment Schedule to be used based on the guidelines below.

Category "A" Pay Adjustment Schedule will be used unless any of the following conditions exist:

1. The route has a posted speed limit of 45 MPH or less.
2. Maintenance of Traffic requirements or other construction issues will result in excessive discontinuities in the surface course.
3. The project only involves a single asphalt course.
4. The surface type is classified as "experimental".
5. Other circumstances indicate that more stringent ride quality specifications would not be attainable or are not in the best interest of the Cabinet.

The Category "B" Pay Adjustment Schedule will apply if any of the above conditions are present.

APPROVED _____ 2/14/08
O. Gilbert Newman, P. E. Date
State Highway Engineer

APPROVED _____ 2/22/08
Jose Sepulveda, P. E. Date
Kentucky Division Administrator, FHWA

TRANSPORTATION CABINET
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Steven L. Beshear
Governor

Joseph W. Prather
Secretary

STATE HIGHWAY ENGINEER POLICY #2008-10

MEMORANDUM

TO: Chief District Engineers
Director of Highway Design
Director of Materials
Director of Construction
Director of Maintenance
Director of Construction Procurement

FROM: O. Gilbert Newman, P.E.
State Highway Engineer

DATE: August 21, 2008

SUBJECT: Elimination of Pavement Incentive Payments
- Rideability
- Lot Pay Adjustments

Due to our current financial situation, we are continuing to review ways by which we can reduce project costs in order to maximize the amount of work we can accomplish within our financial limitations. One of the project cost reductions we have identified involves our current practice of paying incentives for pavement work that is incrementally better than our basic quality standards.

Effective with the October 2008 bid letting, projects containing pavement bid items will not be eligible for incentive payments involving rideability or lot pay adjustments.

OGN/CAK

c: Ray Polly
Bill Gulick
Bob Lewis
Rob Martin