NEBRASKA DEPARTMENT OF ROADS

MATERIALS AND RESEARCH DIVISION
PAVEMENT MANAGEMENT SECTION

PAVEMENT CONDITION SURVEY MANUAL

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PAVEMENT CONDITION SURVEY
INDEX

PURPOSE

This manual has been developed to assist Nebraska Department of Roads personnel in conducting a condition survey of the paved road network in Nebraska.

Included in this manual are instructions for surveying all the state-maintained roads on the Primary, Secondary and Urban Systems as well as Nebraska numbered recreation roads.

The scope of the condition survey is to provide information necessary for scheduling pavement rehabilitation strategies for the Department.

Other benefits of the condition survey include 1) a ranking system for pavement needs studies, 2) a summary of the overall condition of the pavement in any area of the state, 3) a uniform pavement rating system for highways throughout the state, 4) A means of monitoring the condition of any section of pavement with respect to particular special designs, etc., and 5) historical record of pavement performance and maintenance practice.

Department personnel shall conduct the survey on an annual basis. Personnel in the Pavement Management Section will validate the data.

INSTRUCTIONS

A. INTRODUCTION

These instructions provide a procedure for evaluating the condition of all state-maintained roads in Nebraska relative to surface distress conditions as defined within this manual.

For clarity in evaluations, the Nebraska highway network is divided into "homogeneous" sections for field data collection. Basic considerations used in specifying these sections are related to geographical, geometric, traffic, and pavement design information. Highway number and reference post log number define sections. To develop a database of surface condition information, pavements are further classified into three categories: 1) rigid pavements, 2) flexible pavements, and 3) rigid based pavements with flexible overlays. Condition survey data collection is combined for categories 2) and 3) due to similarities in pavement distress items.

Each rater annually will receive a listing, which provides all the network level sections to be rated. The network level sections are listed in order by highway number (links, recreation roads, spurs, and state maintained highways) and by reference post log number.

A general descriptive location printout is provided for each section. The printout is to be directly used in setting up survey sections to be run. Upon completion of rating of each section, the item or record should be lined out.

Raters should thoroughly familiarize themselves with the computer printout for their areas. In order to establish routes for ratings, time should be spent relating the computer listing to detail highway maps of the District. It will not be necessary to survey an entire highway at one time. Each rater should carefully plan the area to be covered for a given day. An effort should be made to evaluate all links, recreation roads, spurs, and highways within that area selected.

One method for survey might be to subdivide the District into quadrants and rate all pavements within that quadrant. In any event, it will be necessary to keep track of what has been surveyed using the computer printed listing.

Note: An exception is made to the foregoing items on newly constructed or relocated roads. These roads should be rated even if they are not on the map or printout. If reference posts are not as yet established on these pavements it will be necessary to use the automobile odometer to generally locate the sections for testing. The reference post log book and odometer readings can be used to derive test site locations for the survey report.

Presently unpaved, gravel roads are not rated. Ratings for these roads may be required in the future.

B. PAVEMENT CONDITION SURVEY FORM

The Pavement Condition Survey forms have been specifically designed to determine the amounts and severities of several distresses for flexible, rigid, and overlays over rigid pavements. Each rater should pay attention to all instructions so that the condition survey can be correctly completed. Missing or improperly marked data will require correction and possible considerable time and effort in rechecking a particular section.

There are two forms used in the rating survey. One form for evaluating the restoration index of rigid pavements, the other form is for evaluating bituminous and bituminous overlay over rigid pavements. Completed forms are shown in Figures 1 and Figure 2 (located in back of manual). In 1994 these two forms have been duplicated in a Microsoft Access database and loaded on a laptop computer.

1) Rigid Pavements

The method of rating rigid pavements is similar to the method and form used for rating bituminous pavements. On this form one line or record represents a test section of pavement. Each test section represents a mile of pavement or less. A detailed analysis is conducted on a segment of pavement within the mile section. This segment consists of ten joints and panels. For a two lane pavement this will consist of five joints in each lane. The remaining portion of the test section is evaluated using a "windshield" survey. The windshield survey will be explained later in this manual.

Detailed condition analysis shall be conducted starting at the first joint past the reference post. At each sample site the highway number and date (month, day, year) shall be recorded.

If a pavement is being rated in a direction of increasing reference post number, the rater shall first perform a detailed observation followed by a "windshield" survey. For surveys conducted in direction of decreasing reference post number, the rater shall conduct the "windshield" survey followed by a detailed inspection at or near the reference post. When rating interstate pavements the detailed survey always begins at the first sawed joint past the reference post even when traveling in decreasing reference post number. This allows the rater to inspect the pavement from the vehicle without having to backup on the shoulder.

A visual "windshield" survey shall be used to evaluate the general surface condition of segments of pavement between routine or detail sampling test sites. Evaluations will be done at normal highway speeds or less. Ratings shall be entered into the laptop when the vehicle is stopped for the next restoration index rating. General condition of the segment is to be

evaluated with the "windshield" survey on rigid pavements. The general condition of the test section is then compared to the site survey. Further details for this type of survey will be found in following sections.

For each observation the rater shall get out of his vehicle and quickly evaluate the distresses on the pavement surface within the ten lane joint and panel region. For rigid pavements the frequency of 1) joint and panel repairs, 2) joint and panel spalls and 3) panel cracks are recorded. The condition of 1) joints, 2) joint seal, 3) panel pattern cracking and 4) panel crack seal are recorded by an alphabetical code system. Distress severities and their respective codes are none (blank), low (L), medium or moderate (M) and high (H). Severity levels of distress shall be classified by comparisons with the photographs given in the Appendix A. The "Nebraska Profiler" collects the fault depth measurement on all joints and transverse cracks.

When rating rigid pavement all ten lane joints are observed and the nominal severities recorded. The nominal severity of the ten panels is observed and recorded. Next the "windshield" survey or consistency is evaluated. This is to determine if the test site is representative of the surface condition of the test segment or mile. The fault measurement on the longitudinal cracks is then entered and the shoulders are rated.

2) Bituminous Pavements

Bituminous pavements will be rated in a similar manner as the rigid pavements. One line or record represents a test section of pavement. Each test section represents a mile of pavement or less. A detailed analysis is conducted on a segment of pavement within the mile section. This segment is about 200 foot in length. The remaining portion of the test section is evaluated using a "windshield" survey.

Detailed condition analyses shall be conducted at the beginning of a uniform segment. Subsequent ratings will be conducted at or near the highway reference posts. At each sample site, the highway number, reference post number, direction of travel, and date (month, day, year) of the observation shall be recorded.

If a pavement is being rated in the direction of increasing reference post number, the rater shall first perform a detailed observation followed by the "windshield" survey. For surveys conducted in the direction of decreasing reference post number, the rater shall conduct the "windshield" survey followed by the detailed inspection at or near the reference post.

A visual "windshield" survey shall be used to evaluate the general surface condition of segments of pavement between routine or restoration index sampling test sites. Evaluations will be done at normal highway speeds or less. Ratings shall also be entered into the database when the vehicle is stopped

for succeeding restoration index ratings. General extent and severity of the major categories of distress are to be evaluated with the "windshield" survey. Further details for this type of survey will be found in following sections.

For each observation, the rater shall get out of his or her vehicle and quickly evaluate the distresses on the pavement surface within the region defined by the pavement width and centerline length of about 200 feet. Each distress will be rated relative to the severity and/or the extent of the distress, beginning with the first distress shown on the left side of the form and continuing to the right.

Distress severity on bituminous pavements can be identified by comparison with catalog photographs of the various distresses accompanied by word descriptions. The severity is usually categorized in one of five simple terms----absent (blank), low, moderate, high, or extra high. Further details regarding this may be found in the section on "Severity Condition".

Extent of an observed distress will be obtained either by comparison of the manifestation to the catalog of reference photographs depicting area or by measurement. Extremely precise measurements are not required. Further details can be found elsewhere in this report.

Upon conclusion of the surface distress rating at each observation site, the shoulder area within the region should be evaluated. Each condition should be evaluated in sequence and the proper rating noted in the appropriate column on the database.

The distress manifestations listed are the types evaluated for Nebraska's bituminous pavements:

Distress Mode	Distress Type
Fracture	Cracking
	Alligatoring
	Edge
	Longitudinal (WP, CLJ, BWP)
	Transverse
	Random/Block
Disintegration	Raveling
	Weathering
	Stripping
	Polishing
	Scaling
Other	Patching
	Pot Holes, Failures
	Excess Asphalt

At highway speeds of 45 to 55 miles per hour, it is impossible to evaluate in detail severity and extent of all distress forms. However, perceptions of major pavement distress are easily attained by visual evaluations at these speeds and a reasonable determination of extent of distress can be made.

A visual "windshield" survey shall be used to evaluate the surface condition of segments of pavement between routine sampling test sites. On moving from one test location to the next the surface will be observed. On stopping at a designated test site on a bituminous pavement, the rater will weigh the severity and extent of the distresses observed during the "windshield" survey with what is observed at the test site. This will be done during the completion of the more comprehensive restoration index information.

The "windshield" pavement condition will focus on these measures of pavement quality:

1. The distress types generally resulting from environmental factors in conjunction with traffic:
   - random or grid block cracking
   - transverse cracking
2. Load associated distress manifestations:
   - alligatoring
   - edge cracking
   - shear failure
   - patching

Extent for the detailed restoration index defines the density of the distress forms throughout the pavement surface. However, for a "windshield" type survey the extent shall be categorized for a much greater length than used for the restoration index. For the "windshield" survey, the extent shall represent the typical or nominal density of all the distresses. The extent photographs in the catalog can be used as a classification or reference criteria. The categories of extent are none (blank), trace, occasional, frequent, extensive or complete. Verbal definitions are defined on pages 14, 15 and 16.

C. SAMPLING PROCEDURE

A pavement management system is complex and it is highly dependent on the quantity and quality of data. Over the years, the NDOR has collected considerable data including ride or roughness, percent cracking, Dynaflect deflection and rut depth on bituminous pavements. The quantity of data taken has remained relatively the same. Due to differences in raters, the quality of measured distress data has sometimes changed with time.

Initially, inventory data at the network level was taken at the rate of once a mile every two years. This was reduced to once a mile every three years to compensate for manpower shortages. However, useful interpretations of this latter data were minimized due to the three years lag in data collection.

To enhance the network level condition data sampling system, a decision was made to collect the pavement information on an annual basis. A more simplified method of evaluating pavement distress has been devised. For collection of the pavement condition data the following procedures will be used:

1. All State marked and/or maintained highways, spurs, and connecting links will be evaluated. Also all recreation area roads which have been improved are to be tested. Recreation roads will be tested and filmed by the "Nebraska Profiler". They will be rated from the images collected by the "Nebraska Profiler".
2. Data collection will be the responsibility of the Pavement Management Section Personnel in Lincoln.
3. Each data collection manager is to undergo a significant training effort to ensure the collection of uniform high quality data. Field training will be provided with "hands-on" instruction on distress survey techniques. This will be conducted on an annual basis.
4. The entire State system is divided into Districts. The pavements in each District are further subdivided into control sections which have basically the same roadway characteristics (i.e., design, number of lanes, age, functional class, etc).
5. The field survey shall be conducted weathering Permitting during the months designated by Highway Management Section. Distress data should not be collected if the road or shoulder is covered with snow or ice. Collection of data during a rain or immediately there-after is not recommended. Observations shall be made by raters only on relatively dry, clear pavement surfaces and shoulders. Raters will have to determine if weather conditions warrant data collection.
6. Pavement survey ratings shall be completed by a deadline established each rating year by the Highway Management Section. Completed survey restoration index rating forms shall be submitted to the Highway Management Section

office on a weekly basis. It is absolutely essential that this data be submitted in this manner so that this information can be edited and entered onto computer files.

7. Open line highway maps shall be used with the rating manual and computer listing as an aid in planning daily rating strategies. All links, spurs and recreation roads not shown on the map shall be located and drawn on the map.

8. For relative ease in rating, a map should be subdivided into quadrangles dependent upon relative miles of pavement to be rated. This will depend upon judgment established by the pavement rater. Generally the area of the quadrangles should be of sufficient extent to include at least a daylong rating session. For example, a county could represent a quadrangle and an attempt should be made to rate all highways within the county before moving to the next.

9. The sampling frequency will be as follows:

   (a) Rigid Pavements

   On rigid pavements, restoration index samples shall be taken at each mile or reference post. For multi-lane highways, (4 or more lanes), each direction of travel shall be rated as a separate section. However, to speed the rating process, the samples for each may be taken at the same location thereby eliminating the need to "backtrack" this area for the survey. On multilane pavements with more than two lanes in a given direction (3 or more lanes), rate only the two lanes nearest the outside shoulder. Interstate and noninterstate pavements shall be rated using the same sample size. For pavements ten lane joints and panels and the shoulder segment shall be rated as a detail survey section. A distress survey observation is to be taken at the beginning of a design section and then at each reference post thereafter. In urban areas (corporate limits to corporate limits) and short segments (<1 mile in length) only one observation is needed per design section if a general survey indicates similar distress condition for the section. Because of the unique frequency distribution of some categories of distresses on some rigid pavements it is possible to derive an erroneous rating of a roadway using only a site sampling technique as described. Consequently to overcome this possibility, it will be necessary to conduct a very general "windshield" survey of the 1 mile sections. These windshield surveys will be conducted at highway speeds of 45 to 55 miles an

hour. Methods for conducting the windshield survey are discussed on pages 6, 7 and 8 of this manual.

(b) Bituminous Pavements

On flexible and composite pavements, a survey of the pavement surface and shoulder segment shall be taken at the rate of one per mile. On sections less than one mile in length, one detailed survey observation shall be taken if in the raters judgment the section consists of a homogeneous distribution of pavement distresses. In urban areas one observation per design section is all that is needed if the condition of the section is essentially the same throughout. Because of the unique frequency distribution of categories of severity and extent of distress in flexible pavements, it is possible to derive an erroneous rating of a roadway using only a site sampling technique as described. Consequently to overcome this possibility, it will be necessary for the rater to conduct a very general windshield survey of the 1 mile sections. These windshield surveys will be conducted at highway speeds of 45 to 55 miles an hour. Methods for conducting the windshield survey are discussed on pages 6, 7 and 8 of the manual.

10. Various design sections are scheduled for construction, resurfacing, or other types of major rehabilitation during a year. It is not necessary to evaluate these pavements, rigid or flexible, if the road is under construction at the time of pavement evaluation.
11. Upon completion of rating the control section, the Rater shall line out that section on the computer printed list in order to keep track of the pavements rated. It would also be a benefit at the conclusion of the days rating to fill in the highways rated on the open line map.
12. Accuracy and correctness in reporting of data is absolutely essential. Mistakes slow the rating report process.
13. Restoration index sample sites shall be located within 0.25 mile of a reference post (XXX.00 to XXX.25). Do not locate observation sites on bridges, approach slabs, driveways and intersections. Safety considerations should be used in selection of the sample site, but locate it as near as possible to the reference post.
14. 3 lane roads shall be rated as a multilane highway. Rate 2 lanes as one direction and one lane the other. The selection of lanes is dependent on the location of

the centerline stripe or consistency in surface type. If the third lane is a climbing lane then only rate the 2 thru lanes. At the present time we have no protocol for reporting information gathered for climbing, turning or lanes of other types.

15. For highways that have a mixture of surfacing types, each surface type will be rated separately. For example, if one lane is portland cement concrete pavement and the other is asphalt pavement, the concrete pavement will be rated using the rigid forms and the flexible pavement using the bituminous forms. Designate the side of the road as A or D with lane numbers as necessary.

16. Rutting is being collected as part of the "Nebraska Profiler" surveys for all of the highways. Manual measurement of rutting will not be needed.

17. Ratings may be conducted on pavements in ascending or descending reference post number. For ratings on highways in ascending reference post number, the reference posts normally will be located to the driver's right. When rating a pavement in descending reference post, the reference posts will normally be to the drivers left. Raters should monitor their vehicles odometer to assist in location of a reference post in the event some are missing, moved, removed, damaged or placed on the wrong side of the road. Restoration index sample sites may have to be located on the basis of odometer readings.

D. SEVERITY AND EXTENT RATING

Severity Condition

Per each distress item, a severity condition of each distress is recorded on the form in the appropriate column. Severity of the distress conditions will be further defined in the condition survey definition section.

The rater shall very thoroughly study and familiarize him or herself with each written distress and classification photograph in the definition section so that a complete understanding of all severity conditions for each distress is maintained.

The definition of each severity level includes word descriptions as well as illustrations. Not all specific phases may be defined. However, there is sufficient information for each rater to mark in the appropriate column whether the distress is absent, low, moderate or high severity. Environmental distresses grid/block and transverse cracking have an extra high severity category in addition to low, moderate and high.

The underlying principle of the severity rating is to determine how advanced the specific distress has become. Severity level answers the question of "how bad is the problem." Quite often it is of great value in determination of maintenance or rehabilitation strategies which may be required for restoration of the road or to correct pavement deficiencies.

In the following sections catalogs of photographs are given to show severity conditions for each distress listed on the bituminous and rigid pavement rating forms. They are provided as reference. The photographs do not show all conditions that might be found. They also are not meant to imply that a condition must look exactly like what it is shown for it to be called low, moderate, high and extra high or extreme.

For severity classifications purposes if a specific distress is seen, the rater is to observe the pavement and if questions develop first compare the lowest severity photograph of the distress observed to that exhibited by the pavement. If the observed distress is judged to be less severe or equal to the catalog photographs then the severity is identified as this lower category. If this condition is not true then the rater compares the highest severity condition catalog photograph to the observed distress. If the observed distress looks equal to the distress in the photograph or worse the severity level is the higher severity condition category. Otherwise for those with three condition categories, the distress if not low or high is classed as moderate or medium. The photographs of moderate need not be used for classification purposes. These photographs are provided only to

illustrate what a moderate or medium severity panel may look like. In the event that the specific distress is not observed, a blank is left in the severity index column.

Upon conclusion of the severity rating, the extent of the distress is noted (if required) and the code letter defining the extent marked on the form.

Extent Condition

Bituminous Pavements:

Items of distress generally have 6 categories of extent. The 6 categories of extent are absent, trace, occasional, frequent, extensive and complete. The extent criteria answers the question of "how big is the problem" by describing the density of occurrence of the distress. The words refer to a percentage of the length or area of the road section being rated. Photographs showing extent are located in Appendix A.

Description	Guide (%)
Absent	Not observed
Trace	Less Than 10%
Occasional	Approx. 10-30%
Frequent	Approx. 30-50%
Extensive	Approx. 50-80%
Complete	>80%

For failures due mainly to load associated distresses the following changes to extent are required:

Description	Guide (%)
Absent	< 2 ft^2 area observed
Trace	2 ft^2 area -10%
Occasional	Approx. 10-30%
Frequent	Approx. 30-50%
Extensive	Approx. 50-80%
Complete	> 80%

For patching due mainly to load associated distresses the following changes to extent are required:

Description	Guide (%)
Absent	< 1% observed
Trace	Approx. 1-10%
Occasional	Approx. 10-30%
Frequent	Approx. 30-50%
Extensive	Approx. 50-80%
Complete	> 80%

When failures are associated with transverse cracks or random or block cracks, the judgment of the rater shall determine the extent. At least 1/3 of all environmental cracks observed could exhibit failure condition. Typically, failures do not usually exceed the occasional category of extent.

Extent condition shall not apply to the ravel/weathering, rutting, and excess asphalt distress items. The nominal manifestations of these distresses are generally extensive or complete. Rutting is considered to be throughout and in both wheel paths.

Transverse cracking is treated differently from other distress. The extent of transverse cracking is a function of frequency rather than area of distress. The density of occurrence of transverse cracking is defined as follows:

Description	Guide
Absent	Not Observed
Trace	Distance between cracks greater than 500 ft. (< 11 cracks per mile)
Occasional	Distance between cracks from 200 to 500 feet. (11 to 26 cracks per mile)
Frequent	Distance between cracks from 100 to 200 feet. (27 to 53 cracks per mile)
Extensive	Distance between cracks from 50 to 100 feet. (54 to 106 cracks per mile)
Complete	Distance between cracks less 50 feet. (Over 106 cracks per mile)

A small hand counter may be used as an aid in counting transverse cracks.

Problems with variable bituminous pavement scores as a result of reactive maintenance activities have been discovered. These surface treatments temporarily hide the existing pavement distresses and produce an inflated or erroneous value for the pavement. In an effort to give credit for maintenance activities and still maintain valid scores, the rating system was modified in 1997. To reduce these problems the "Bituminous Remarks Code" column was added to the rating forms. With this coding system we can improve the rating of the pavement yet retain the historical distresses. This system is to be used only when some maintenance activity has been performed since the last evaluation. At times maintenance activity is difficult to recognize. Especially when the treatment has been seasoned by over nine months of weathering. A particular maintenance activity shall only be recognized once by this system.

Under this system the following activities are recognized: Armor coats, Fog seals, Skin patches, Crack seals, Machine Patches, Slurry seals and Milling. Two other remarks, Definitions and Verification change have been reserved for administrative review of the pavement ratings. Fog seals generally do not rehabilitate the pavement enough to warrant upgrading the ratings; it is included here only for possible future analysis.

When the data collection manager recognizes a maintenance activity he or she may improve the severity of one or all distresses by one level, but not the extent. The maintenance activity must cover 80% of the section or mile before adjustments can be made to the ratings. All the distresses may or may not be upgraded. It is up to the judgment of the rater to determine if maintenance activity improved any of the severities. For example the rating for transverse cracking may be reduced from "X" severity to "H" or "H" to "M" etc. Any severity of distress may be improved if an armor coat, machine patch, etc. covers it up or makes it look better. The extent may not be adjusted. A "T" (trace) remains a trace or increases to "O", "F", "E", or "C"; an "O" (occasional) will remain an "O" or increase to "F", "E", or "C" etc. Extent may be changed only when resurfacing or reconstruction occurs on the sample section. The only exception to this is that the extent of failures may be reduced or eliminated by the placement of a good armor coat or machine patch. The extent of failures may be lowered if the rater recognizes a meaningful improvement gained by these maintenance activities.

When a rater strongly disagrees with the ratings with no visible sign of maintenance activity, they are requested to report this disagreement to the Pavement Management Supervisor for review.

Bituminous Remark Codes

AC	Changes in rating due to armor coats.
CS	Changes in rating due to crack seals.
FS	Changes in rating due to fog seals.
MI	Changes in rating due to surface milling.
MP	Changes in rating due to machine patches.
NC	Changes in rating due to new construction.
SP	Changes in rating due to skin patches.
SS	Changes in rating due to slurry seals.
DF	Changes in rating due to definitions only when distresses are miss-identified. (administrative use only).
VE	Changes in rating due to verification (administrative use only).

Rigid Pavements:

For rigid pavements the frequency of distress is noted in many cases. For distresses of 1) joint and panel spalls, 2) joint and panel repairs, 3) slab cracking; the number of joints or panels exhibiting these conditions at the ten lane joint sample site will be recorded. The code for the frequency is as follows:

Numerical Description	Number Observed
Blank	Not Observed
01	1
02	2
03	3
04	4
05	5
06	6
07	7
08	8
09	9
10	10

E. CONDITION SURVEY DEFINITIONS

Pavement distress conditions on the restoration index survey forms are defined in Appendix A. Each written page discusses one of the distress conditions. Photographs of the different severity conditions are included following each distress to help clarify what the distress definitions mean.

The rater shall very thoroughly study each written distress with accompanying photographs so that he or she completely understands all severity conditions under each distress. This is critical to the survey if a uniform rating system is to be successfully performed across the state.

One or more photographs are shown for each of the severity conditions for each distress. These photographs do not show all conditions that might be found. They also are not meant to imply that a condition must look exactly like what is shown for it to be called low, moderate, high or extra high. The pictures are simply illustrations of what the rater may see under the various severities for each distress.

The definitions for each severity include one or more phrases that describe what the condition may look like. Certainly not all of the specific phrases must exist for a condition to be labeled as such.

The rater shall mark down the severity and extent of the distress on the basis of the procedures outlined in the appropriate sections that have been presented using the photographs in question.

F. SAFETY

The task of rating should not be done at the sacrifice of safety. It should be noted that while the rater is evaluating the roads, concentration is needed. While the rater is busy working on the road he or she may forget that traffic is near and traveling at highway speeds. Often these drivers may not be very alert to a single worker on the roadway.

Fluorescent orange or yellow caps and safety vests are required to be worn when the rater is out of the car examining the highway. In addition, the vehicle should be equipped with a strobe warning light or similar device to alert approaching traffic. The rater should also pick test sites that will afford the best possible sight distance when possible.

When the test site is chosen, the car should be parked as far to the right on the shoulder as safely feasible. Above all, **good common sense** should be used at all times.

APPENDIX A

CATALOG OF DEFINITIONS OF PAVEMENT DISTRESS

BITUMINOUS PAVEMENTS

ALLIGATOR CRACKING

Low: Longitudinal disconnected hairline cracks no greater than 1/8 inch wide running parallel to each other; initially may be only a single crack in the wheel path but could also look like an alligator pattern.

Moderate: Longitudinal cracks in wheel path(s) forming an alligator pattern; cracks may be lightly spalled and are about an 1/8 to ¼ inch wide.

High: Cracking has progressed so that pieces appear loose with severely spalled edges; cracks are probably ¼ inch wide or greater; pumping of fines through the cracks may be visible on the pavement surface; potholes may be present.

Description:

Alligator cracking is a load associated structural failure. The failure can be either in the surface, base or subbase. Permanent deformation (rutting) does not have to be present for there to be alligator cracking.

Cracking usually first begins in the wheel path, usually as longitudinal cracking. Further stress creates an alligator pattern. If the surface is very flexible, the longitudinal crack will become wider and an alligator pattern may not develop until severe distress sets in. The proper solution for both alligator and longitudinal cracking is the same since structural failure is taking place in both cases.

ALLIGATOR CRACKING - LOW SERVERITY

ALLIGATOR CRACKING - MODERATE SEVERITY

ALLIGATOR CRACKING - HIGH SEVERITY

EDGE CRACKING (EDGE DETERIORATION)

Low: Hairline cracks just beginning to show; cracks are random with no pattern; cracks may be up to ¼ inch wide.

Moderate: Cracks are wider, being from ¼ inch to ½ inch in width or an alligator pattern of cracks more than a foot in width measured from the pavement edge.

High: Cracks greater than ½ inch, or alligator sections which have failed; pieces of pavement may be loose, or missing, or potholes may be present.

Description:

Edge cracking is similar to alligatoring only located within 1-2 feet of the edge of the pavement. Failure begins at the edge of the road and progresses toward the wheel path. Pavement edge distress can result in worsening of wheel path condition, allow moisture intrusion in the subgrade soils and base materials. This cracking may occur in combination with other distresses.

Longitudinal cracking in asphalt pavements due to concrete base course widening is also included in edge cracking. This type of cracking generally occurs 1 to 2 feet from the outer edge of the pavement and parallel to it. The frequency is usually extensive or complete thru the entire section.

EDGE CRACKING - LOW SEVERITY

EDGE CRACKING - MODERATE SEVERITY

EDGE CRACKING - HIGH SEVERITY

FAILURES (POTHOLES/SPALLS/SHEAR FAILURES)

Description:

Sections with scattered potholes and shear failures are difficult to evaluate. Potholes represent spot alligator sections of a high severity level. Regions surrounding the potholes can vary in severity level. Another difficulty in rating potholes, spalls or shear failures is that maintenance forces use spot, skin or deep patching to try to repair them. Consequently the following rating system was developed:

1. All potholes, spalls, or localized shear failures shall be considered as high severity. When failures are repaired by spot, hit and run, base repairs and patching or machine patching; they may still be classified as failures in addition to being patches. Small repaired potholes and shear failures can be still classified as failures.

No pothole, spall, or shear failure will be rated low, or moderate severity. Failures will be recorded when the area failed is equal to or greater than 2 ft^2 of the segment area.

FAILURES

PATCHING

Good: The quality and condition of the patch is excellent. Patches show no distress such as cracking or raveling.

Poor: Patches are showing some distress. Edges of the patch are abrading. Hairline cracks are beginning to show. Patches are failing showing multiple cracks and distortion or the edges of patches are separating.

Description:

Patching is defined as any surface area of the existing pavement that indicates some type of maintenance repair has taken place. These patched areas may be skin patches or armor coats, full depth patches, or overlays. They may be at spot locations, along edges, in wheel paths, across the entire surface for various distances or a combination of any of these. Crack sealing shall not be considered as patching. Patching will be recorded when the area of patches is equal to or greater than 1% of the segment area. Small patches repairing potholes or shear failures are also classified as failures. An application of a good armor coat or machine patch doesn't necessarily imply that failures are present. Conversely application of a good armor coat or machine patch may reduce the extent of failures. The rater may choose to eliminate failures from a segment after the application of a good armor coat or machine patch.

PATCHING - Good

PATCHING - POOR

LONGITUDINAL CRACKING

Low: A continuous or discontinuous hairline to ¼ inch in width crack running parallel to centerline of the pavement. The distress may be manifested as only a single crack but could, due to it being disconnected, be somewhat similar to multiple or alligator cracking.

Moderate: Those cracks parallel to the centerline of the pavement are about an ¼ to ½ inch in width.

High: Those single longitudinal cracks wider than ½ inch in width.

Description:

Longitudinal cracking can be observed in the wheel paths, at lane joints, such as centerline and surface/shoulder joints. Those longitudinal cracks that occur between the wheel paths shall be included in the column designated as BWP. Those cracks located along the centerline and lane/shoulders area are often due to the quality of construction practices. Longitudinal cracks in the wheel paths are due primarily to vehicle load, while those occurring between the wheel paths can be thermal or as a consequence of shear failure.

LONGITUDINAL CRACKING - LOW SEVERITY

LONGITUDINAL CRACKING - MODERATE SEVERITY

LONGITUDINAL CRACKING - HIGH SEVERITY

RANDOM/GRID BLOCK CRACKING

Low: Hairline cracks to ¼ inch in width are essentially transverse, with some interconnecting longitudinal cracking. The pattern may be block, map, or dendritic. Crack spacing may be relatively great (50 to 100 foot apart).

Moderate: Cracks may be ¼ to ½ inch in width and may or may not be slightly spalled. Definite cusps within the region of the crack are evident.

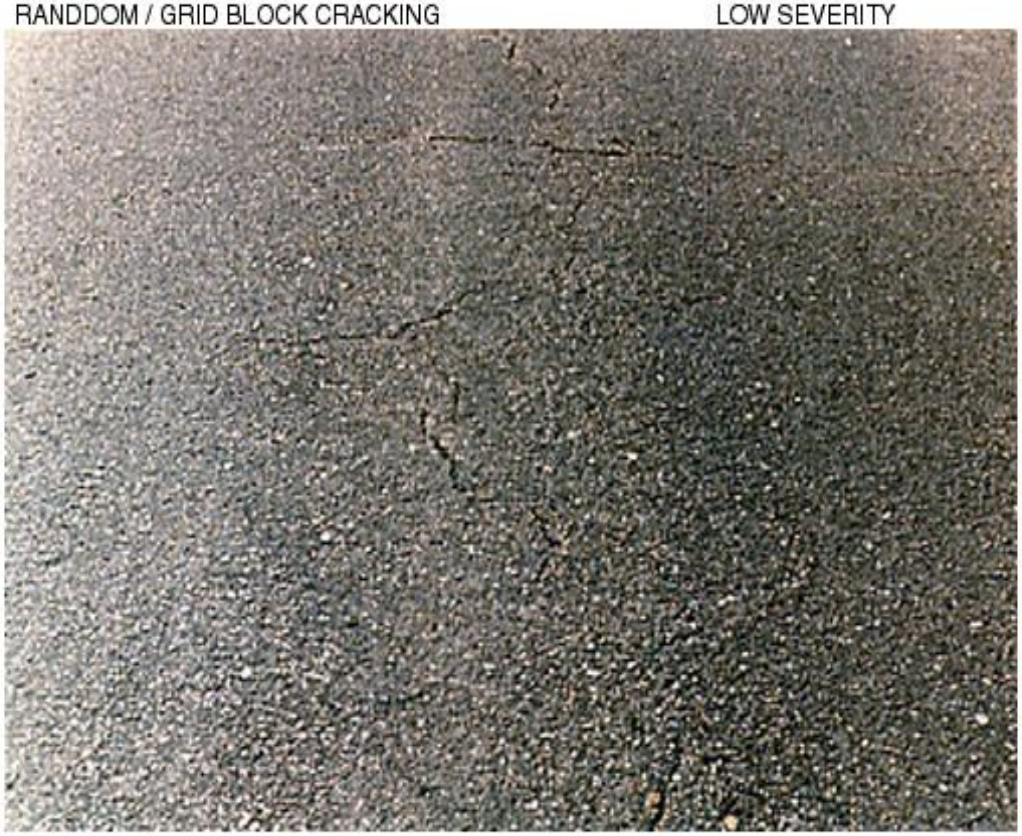
High: Block, map, or dendritic cracks with single cracks greater than ½ to 2 inches in width or multiple cracks hairline or wider. These cracks are usually cusp with regions outside of the cracked areas distorted or slightly bulged. The surface often takes on a "turtle" or "tortoise" shell appearance.

Extreme: Single cracks greater than 2 inches wide, many bundles of multiple cracks, cracks spalled and cracks with depressions greater than 1 inch. Cracks are quite noticeable when driven over at highway speeds. The ride can be described as "bone jarring" and "teeth rattling".

Description:

Random block or grid block cracks divide the pavement into rough rectangular or polyangular pieces. This type of cracking is thermally induced, not load associated. As a result of water penetration, changes in slab design geometrics and accumulated loadings in the wheel path, alligatoring and shear failure often develops. Slippage is also included in this category. Sealing of these as well as transverse cracks is important.

RANDDOM / GRID BLOCK CRACKING LOW SEVERITY



RANDOM / GRID BLOCK CRACKING - MODERATE SEVERITY

RANDOM/BLOCK CRACKING - HIGH SEVERITY

RAVELING/WEATHERING

Low: Minimal aggregate loss. Small amounts of pitting may be detected. Aggregate or binder has started to wear away.

Moderate: Nominal aggregate loss. Small areas stripped away.

High: Pitting, stripping, and erosion of aggregate. Large sections greater than one square foot may be evident.

Description:

Raveling is the wearing away of the pavement surface caused by dislodging of aggregate particles in mixes that are low in asphalt binder. This can be caused by construction, weather, and traffic elements.

RAVELING/WEATHERING - LOW SEVERITY

RAVELING/WEATHERING - MODERATE SEVERITY

RAVELING/WEATHERING - HIGH SEVERITY

RUTTING

Description:

A rut is a surface depression in the wheel path caused by permanent deformation in any pavement layers or subgrade due to traffic load applications. The “Nebraska Profiler” collects rut depth information.

RUTTING LOW SEVERITY

MODERATE SEVERITY

RUTTING - HIGH SEVERITY

EXCESS ASPHALT

Low: Intermittent films of bituminous material can be seen on surface of the pavement. These create a shining, reflecting surface. Aggregate is present but appears sparsely distributed throughout the bituminous material.

Moderate: Large areas or continuous strips of bituminous films which are shining in appearance. Little if any aggregate can be seen in the bituminous films. The bituminous areas appear almost fluid but do not track or peel.

High: Areas of excess bituminous films which are fluid and exhibit plastic flow. Little if any aggregate can be observed. Excess bituminous material is wet appearing and actually liquefies during hot weather.

Description:

Bleeding or excess asphalt at the surface of a bituminous road can be caused by a variety of factors including too much asphalt in the mix, asphalt too soft for climate, consolidation of the surface, stripping, and other reasons. The defect is usually traffic related and often occurs in the wheel tracks. It can cause skidding problems and be a traffic hazard.

EXCESS ASPHALT - LOW SEVERITY

EXCESS ASPHALT - MODERATE SEVERITY

EXCESS ASPHALT - HIGH SEVERITY

TRANSVERSE CRACK

Low: Cracks hairline to ¼ inch wide. Cracks have little or no spalling or depression.

Moderate: Cracks ¼ to ½ inch in width generally perpendicular to pavement centerline extending the full width of the pavement.

High: Single cracks ½ to 2 inches wide, single bundles of multiple cracks, cracks spalled and cracks with depressions or bumps near 1 inch.

Extreme: Single cracks greater than 2 inches wide, many bundles of multiple cracks, cracks spalled and cracks with depressions greater than 1 inch. Cracks are quite noticeable when driven over at highway speeds. The ride can be described as "bone jarring" and "teeth rattling".

Description:

Transverse cracks are those considered to extend greater than ¾ the width of the pavement generally perpendicular to the centerline of the pavement. Cracks extending less than ¾ of the width of the pavement will be considered random or grid block cracks. The cracks generally result from thermal or other environmental conditions. They appear in both portland cement pavements and asphaltic concrete pavements. This type of cracking is very common in Nebraska flexible pavements. It should not be confused with the random or grid block cracking.

TRANSVERSE CRACKING - LOW SEVERITY

TRANSVERSE CRACKING - MODERATE SEVERITY

TRANSVERSE CRACKING - HIGH SEVERITY

TRANSVERSE CRACKING

"X" Severity

RIGID PAVEMENTS

JOINT CONDITION

Low: A few fine hairline cracks from the joint suggesting slight pressure, or fine hairline structural cracks within 2 foot of the joint or repair. Discoloration at the joint with or without visible cracking shall be designated low severity.

Moderate: Frequent hairline to 1/8 inch wide cracks radiating from the joint or repair. These are generally web like in character. This category also includes structural hairline breaks or fractures within 2 foot of the joint or repair.

High: Cracks 1/8 inch or larger of multiple pattern cracks often exhibiting damp or white exudates. This distress differs from structural breaks in that cracks are semi-circular, hyperbolic and closely spaced. This category shall also include 1/8 inch or larger structural corner joint fractures, restraint stress cracks from improperly aligned or lubricated (frozen) dowel bars, pumping or blow up cracks, within 2 foot of the joint or repair.

Description:

This category includes distresses near sawed construction joints and joints created as a result of a 12' wide concrete repair of a failed joint. Distresses can result from deterioration or deficiency of the pavement itself or from structural inadequacy.

In connection with joint condition three other associated distresses are evaluated. These are 1) spalling at the joint, 2) faulting or displacement and 3) joint seal.

Spalling at the joint usually takes place in the region of highest concentration of load application or in the wheel track region. Its probability of occurrence is highest for joints in a high severity condition and minimal for the low severity level case.

Spalling at any condition is considered a significant distress in that it leads to excessive pavement roughness and requires immediate maintenance.

Spalling will be recorded if an area of 2 square feet or more is observed within 2 feet of the joint. It is recorded as observed (X) or absent (blank).

REGULAR JOINT - LOW SEVERITY

REGULAR JOINT - MODERATE SEVERITY

REGULAR JOINT - HIGH SEVERITY

REPAIRED JOINT - LOW SEVERITY

REPAIRED JOINT - MODERATE SEVERITY

REPAIRED JOINT - HIGH SEVERITY

FAULTING

Blank: A fault or displacement between adjacent panels of a joint or transverse crack of less than 1/8 inch.

Low: A fault between 1/8 to ¼ inch.

Moderate: A fault between ¼ to ½ inch.

High: Faults in excess of ½ inch.

Description:

Another distress, which decreases serviceability sharply, is faulting that can develop at joints and transverse or longitudinal cracks in rigid pavements. For rating purposes both joints and cracks are measured and that distress manifestation which shows the nominal maximum faulting is recorded. The "Nebraska Profiler" collects faulting data on transverse joints and cracks. Longitudinal crack faulting will be measured by the pavement raters.

JOINT SEAL

Description:

As a preventative to pumping, further displacement or early fatigue failure it is important that all joints and transverse cracks a ¼ inch or larger be sealed. For rigid pavement rating, those joints or cracks which require sealing or those which the seal is no longer functioning in 50% or more of the joint or crack will be marked with an "x", otherwise it is left blank.

FAULTING - HIGH SEVERITY

PATTERN CRACKING

Low: Negligible to occasional interconnecting 1/16 inch wide or less pattern or dendritic cracking. Very fine hairline cracks throughout the slab also shall be designated as low.

Moderate: Interconnected cracks 1/16 to 1/8 inch in width throughout the panel. These cracks may be interlaced with low severity pattern cracks. A few high severity pattern cracks (1/8 inch or greater) may be observed.

High: Occasional to extensive interconnecting pattern or dendritic cracks 1/8 inch or greater cracks interspersed with low and moderate severity pattern cracks. The spacing between high severity cracks is generally only a few inches.

Description:

Within a panel, the appearance of map, pattern, or "D" cracking signals the approaching loss in durability of portland cement concrete. The manifestation can result from cement-aggregate reaction, nondurable materials and/or climatic conditions. Severity level is sometimes an indication of structural adequacy. For rating Nebraska rigid pavements a value indicating severity is used.

PATTERN CRACKING - LOW SEVERITY

PATTERN CRACKING - MODERATE SEVERITY

PATTERN CRACKING - HIGH SEVERITY

PANEL SPALLS

Description:

Scaling or spalling of concrete can result from a variety of causes. Such distress leads to roughness and often indicates poor concrete durability or possible structural inadequacy. Spalling will be recorded if an area 2 ft^2 or more is observed per 12 foot wide panel. The number of panels spalled in the 10 panel sample site will be recorded. The measurement is made on spalls or asphalt patched regions in a panel within the slab beyond two feet either side of the transverse joints. The measurement is made visually.

PANEL SPALLS

SLAB CRACKING

Class I: Single structural cracks in a pavement panel, longitudinal, transversely or diagonal in nature. Cracks are hairline but must extend joint to joint (longi-tudinally, transversely or diagonally). The cracks break the slab into two pieces with no displacement vertically or horizontally. Aggregate interlock remains intact providing load transference across the panel.

Class II: A single structural crack that extends joint to joint that has faulted or separated or multiple cracks that still retain aggregate interlock or some combination of the above which breaks the panel into two or more pieces.

Description:

A significant cause of distress in rigid pavements deals with the structural adequacy of the pavement-base-subgrade structure. Cracks can come from warping, contraction, pressure and loadings that form joints in the pavement. These uncontrolled joints can also fault and spall. To define slab cracking for Nebraska rigid pavements severity of structural cracking is considered. Sealed and unsealed slab cracks of the same width are rated equal. The total number of panels noted in both Class I and Class II will not exceed 10 (The total number of panels rated).

SLAB CRACKING CLASS Ⅱ

SLAB CRACKING CLASS Ⅰ

SLAB CRACKING - CLASS II

SHOULDER WIDTH AND CONDITION

TYPE OF DISTRESS		SEVERITY
Lane/Shoulder Separation	Blank:	No separation.
	"X":	1 inch vertical and/or ¼ inch horizontal displacement between edge of pavement and surfaced shoulder.
Bituminous Shoulder Condition	10:	No Distresses.
	07 to 09:	Transverse Cracks only.
	07 to 09:	Edge Cracks only.
	04 to 06:	Transverse & Edge Cracking.
	04 to 06:	Light Class II (alligator) cracks.
	01 to 03:	Moderate to High Class II or Class III (Failures and/or Breakouts) cracking.
PCC Shoulder Condition	10:	No Distresses.
	07 to 09:	Low Distress.
	04 to 06:	Moderate Distress.
	01 to 03:	High Distress, only when patched.
Drop Off	Blank:	No drop off.
	"X":	Displacement between edge of pavement or paved shoulder and unpaved shoulder > ¼ inch.
Drainage	Blank:	Good drainage.
	"X":	Flat shoulder or one with drainage toward pavement.
Erosion	Blank:	Shoulder OK. Little if any erosion. Relatively thick vegetation to prevent soil erosion.
	"X":	Sparse vegetation. Soil shows piping, gulling, grooves, etc.

DESCRIPTION:

If the shoulder is paved, and the width is greater than 4 foot, lane/shoulder separation and surface condition will be recorded.

Rating of the unpaved portion of a shoulder shall consider drop off, drainage, and erosion.

LANE/SHOULDER SEPARATION

LOW SEVERITY

HIGH SEVERITY

SHOULDER DETERIORATION LOW SEVERITY

MODERATE SEVERITY

SHOULDER DETERIORATION - HIGH SEVERITY

SHOULDER DROP - OFF

EROSION

EXTENT

DESCRIPTION

Extent describes "how big is the problem". The 6 categories of extent apply to alligator, edge, longitudinal, random or grid block, and transverse cracking and patching. The guidelines for determining extent are described on pages 14 and 15 of the report.

For rigid pavements the following distresses are counted at a sample site: 1) joint and panel repairs, 2) joint and panel spalls, and 3) class of slab cracking. Extent of rigid pavements is defined on page 17 of the report.

ENVIRONMENTAL DISTRESS

ABSENT

TRACE

ENVIRONMENTAL DISTRESS

OCCASIONAL

FREQUENT

ENVIRONMENTAL DISTRESS

EXTENSIVE

COMPLETE

EXTENT

LOAD DISTRESS

ABSENT

TRACE

EXTENT

LOAD DISTRESS

OCCASIONAL

FREQUENT

EXTENT

LOAD DISTRESS

EXTENSIVE

COMPLETE

APPENDIX B

RESTORATION INDEX CODES

BITUMINOUS PAVEMENT CODES December 16, 2002 .

Highway Number: Examples (L10C) (002) (080) (180) Enter left justified.
Reference Post: Must be numeric, Examples (00050) (00100) (01000) (10000).
Direction Code: B = Both Directions on 2-lanes, A = Ascending, D = Descend on 3-lane or more.
Lane Usage Code: TH = Thru Lanes
Lane Number: 1 = First lane on either side of CL or Median, 2 = Lane to right of lane 1, 3 = Lane to right of lane 2, Etc.
Date: Enter numeric month, day and year, Ex. 03071994.

Restoration Index (Bituminous Pavements) Codes

Pavement Surface	**Severity**	**Extent**
Long. Crack (Edge Cracking) (WP) (CLJ) (BWP)	Blank = Absent L = Low M = Moderate H = High	Blank = Absent T = Trace < 10% O = Occasional 10%-30% F = Frequent 30%-50% E = Extensive 50%-80% C = Complete > 80%
Grid/Block Cracking (Slippage)	Blank = Absent L = Low M = Moderate H = High X = Extra High Severity	Blank = Absent T = Trace < 10% O = Occasional 10%-30% F = Frequent 30%-50% E = Extensive 50%-80% C = Complete > 80%
Transverse Cracks 01-10=T Number of 11-26=O Cracks Per Mile 27-53=F 54-105=E >105=C	Blank = Absent L = Low M = Moderate H = High X = Extra High Severity	Blank = Absent T = Trace (>500') O = Occ. (200'- 500') F = Freq.(100'- 200') E = Ext. (50'- 100') C = Compl. (< 50')
Alligatoring Wheel Path (Cusp) Center Line Between Wheel Path	Blank = Absent L = Low M = Moderate H = High	Blank = Absent T = Trace < 10% O = Occasional 10%-30% F = Frequent 30%-50% E = Extensive 50%-80% C = Complete > 80%
Failures 1% of distressed or cracking area. Edge Centerline, Alligator, Transverse or Grid/Block Cracking. Also "throw & roll, hit & run" patches		Blank = Absent < 2 SqFt. T = Trace 2 Sq.Ft.-10% O = Occasional 10%-30% F = Frequent 30%-50% E = Extensive 50%-80% C = Complete > 80%
Patching Machine Blade Mix Skin Armor Coat (Armor Coat & Slurry Seal do not Slurry Seal necessarily imply failures)	Blank = Absent G = Good P = Poor	Blank = Absent < 1% T = Trace 1%-10% O = Occasional 10%-30% F = Frequent 30%-50% E = Extensive 50%-80% C = Complete > 80%
Ravel/Weathering	Blank = Absent L = Low M = Moderate H = High	
Excess Asphalt	Blank = Absent L = Low M = Moderate H = High	
Bituminous Remark Code (Can improve rating 1 severity level for AC, MP, SP, CS or SS Ex. X to H, H to M etc. Extent remains the same.)	AC= Armor Coat FS= Fog Seal NC= New Construction MP= Machine Patch SP= Skin Patch CS= Crack Seal	SS= Slurry Seal MI= Surface Milling

Pavement Surface	**Severity**
Joint Repairs - Count number of repairs	Full and Partial
Joint Severity	Blank = Absent L = Low M = Medium H = High
Joint Spalls - Count no. of spalled joints (1 sq. ft. min./12 ft. joint)	
Joint Seal 50%	Blank = Satisfactory X = Unsatisfactory
Panel Surface	
Panel Cracks - Class I -- Count panels with Class I distress.	
Panel Cracks - Class II - Count panels with Class II distress.	
Pattern Crack	Blank = Absent L = Low M = Moderate H = High
Panel Spalls - Count panels spalled. 2 sq. ft. or more per 12' wide panel	
Panel Repairs - Count panels with repairs.	
Crack Seal 50% X = Not sealed G = Good seal P = Poor seal	
Panel Crack Faulting used for Class 2 Panels	Fault or Displacement
If the majority of the panels with slab cracking contain Class II cracks then a rating of the severity of displacement of the Class II cracks is recorded.	Blank = 0 - 1/8" L = >1/8" - 1/4"
If the pavement is six inch depth and any of the panels have Class II cracks then a rating of the severity of displacement of the Class II cracks is recorded.	M = >1/4" - 1/2" H = >1/2"
Surfaced Shoulders	
Lane/Shoulder Separation	Blank = Absent X = Present

Deterioration	Bit Shoulder		PCC Shoulder
	No Distresses	=10	No Distresses
1 - 10 Scale	Transverse Cracks	=7 to 9	Low
10 = Best	Edge Cracks	=7 to 9	
1 = Worst	Transverse & Edge	=4 to 6	Moderate
	Light Class II	=4 to 6	
	Moderate/High Class II/III	=1 to 3	High only when patched

Class II = Allig cracking
Class III= Failure/Break Out

Unsurfaced Shoulders		
Drop Off 1" horiz. or vert.	Blank = Satisfactory	X = Poor
Drainage	Blank = Good	X = Poor
Erosion	Blank = Absent	X = Evident

SAMPLE FORMS

RATING FORMS – Flexible Pavements

The following section gives a brief description of each distress and what is required on the rating form. For a more detailed description of the distresses refer to the previous section. For bituminous pavements consider a 200 foot long segment in the detail sample site

PAVEMENT CONDITION

EDGE CRACKING: Observe and record the severity and extent of edge cracking observed.

WHEEL PATH CRACKING: Observe and record the severity and extent of wheel path cracking observed.

CENTERLINE CRACKING: Observe and record the severity and extent of centerline cracking observed.

BETWEEN WHEEL PATH CRACKING: Observe and record the severity and extent of between wheel path cracking observed.

GRID/BLOCK CRACKING: Observe and record the severity and extent of grid/block cracking observed.

TRANSVERSE CRACKING: Observe and record the severity and extent of transverse cracks observed.

ALLIGATOR CRACKING: Observe and record the severity and extent of alligator cracking observed.

FAILURES: Observe and record the amount of failures observed.

PATCHING: Observe and record the severity and extent of patches observed.

WEATHERING: Observe and record the severity of weathering observed.

EXCESS ASPHALT: Observe and record the severity of excess asphalt observed.

BITUMINOUS REMARKS: Observe and record maintenance activity placed since the last visual rating.

Figure 1

DATE	HWY	RP	LD	LT	LN	EC	WP	CL	BW	GB	TC	AG	F	PA	W	X	BR	SS	SC	DO	DR	ER	NSI	REMARKS
12132002	281	12400	B	TH	1			LO		LT	LC			GC		L			08				095	
12132002	281	12500	B	TH	1		LT	LO	LT	LT	LC			GC		L			08	X		X	095	
12132002	281	12600	B	TH	1		LT	LO	LT	LT	LC			GC		L			08				095	
12132002	281	12700	B	TH	1		LO	LE	LT	LT	LC			PC		L			08				090	
12132002	281	12800	B	TH	1		LT	LF		LO	LC			PC		L			08				090	
12132002	281	12900	B	TH	1	MT	LT	LO		LT	LC		T	GC		L			08				081	
12132002	281	13000	B	TH	1		LT	LE	LT	LT	LC	LT	T	GC		L			08				079	
12132002	281	13100	B	TH	1			LT		LT	LC			GC		L			08				095	
12132002	L10B	00003	B	TH	1	HT	MT	LO	LO	MT	MC	MT	T	PT		L				X			072	
12132002	L10B	00032	B	TH	1	HE	LO	LO	LO	LE	LC	LO	T	PC						X			068	
12132002	L10B	00100	B	TH	1	HE	MO	LO	LO	LE	LC	LO	O	PC		L				X			049	
12132002	L10C	00200	B	TH	1		LO	LO	LO	LO	ME	LT	T	PT		L							078	
12132002	L30F	00021	B	TH	1	HF	HT		HF	HO	XE	HT	O	PC						X			046	
12132002	L30G	00000	B	TH	1	HO	HO	HO		HT	XC	HT	O	PC						X			046	
12132002	L40C	00000	B	TH	1					LT	LT					L							098	
12132002	L40C	00030	B	TH	1	LT	LT	LO	LT	LT	LE	LT	T		L					X			080	
12132002	L40C	00100	B	TH	1	LT	LO	LT		LT	LE	LT			L					X			093	
12132002	L40C	00200	B	TH	1	LT	LT	LT	LT	LT	LE	LT			L					X			094	
12132002	L40C	00300	B	TH	1	LT	MO	LT	LT	LT	LE	LT	T		L					X			074	
12132002	L40C	00400	B	TH	1	LT	LT	LT		LT	LE				L					X			096	
12132002	L40C	00500	B	TH	1	LT	LO		LT	LT	LE	LT	T		L					X			079	
12132002	L93B	00500	B	TH	1		HT	LT		MT	HF		T	PC					07				077	
12142002	S01A	00006	B	TH	1		LF	LF	LT	LT	LF	LT	T							X			078	
12142002	S01A	00100	B	TH	1		LF	LE	LO	LT	LE	LT								X			089	
12142002	S01A	00200	B	TH	1	LT	LO	LF	LT	LT	LF	LT	T							X			079	
12142002	S01A	00300	B	TH	1			LF		LT												X	098	

RATING FORMS – Rigid Pavements

The following section gives a brief description of each distress and what is required on the rating form. For a more detailed description of the distresses refer to the previous section. For PCC pavements consider ten 12 foot wide (lane width) joints and panels in the detail sample site

JOINT CONDITION

REPAIRS: Observe and record the number of full depth, full lane width repairs at the test site.

SEVERITY: Input the nominal severity of pressure cracks within two feet of the joint or joint repair. Blank = No pressure cracking; L = Light severity; M = Medium or moderate severity; H = High severity.

SPALLED: Observe and record the number of lane joints spalled (any spalled area larger than two square feet per lane joint).

SEALED: Observe and record the nominal condition of the test site. Blank = Seal OK, X = More than 50% of lane joint is unsealed or the sealant is failing.

PANEL CONDITION

CLASS OF CRACKS:
CLASS I: Generally the panel is broken into two pieces by a single hairline crack with little or no separation (pieces still interlocked). The slab pieces are not faulted. The cracking is usually of low severity and extends completely across the panel.

CLASS II: The slab is broken into three or more pieces by transverse or longitudinal (slab) cracking. The pieces may be displaced or faulted and the cracks may or may not be sealed. A slab with a single structural crack may be classified as Class II panel if the crack has faulted or shows horizontal displacement demonstrating failed aggregate interlock (structural failure).

For both Class I and Class II conditions observe and record the number of slabs in each condition. The total number of panels at a test site exhibiting Class I and Class II cracking will equal 10 or less.

PATTERN CRACKS: Input the nominal severity of the pattern cracking observed. Blank = None observed; L = Light severity; M = Medium or moderate severity; H = High severity.

SPALLED: Observe and record the number of panels containing spalled areas of greater than 2 square feet. Include spalls patched with asphalt material.

REPAIRS: Observe and record the number of panels repaired by full depth or partial depth concrete patches.

CRACK SEAL: Observe if the transverse and/or slab cracks are sealed and if sealed rate the quality of the seal. X = Not sealed; G = Good seal; P = Poor seal.

FAULT MEASUREMENT: The pavement rater collects longitudinal crack faulting. The Nebraska Profiler collects the nominal average fault depth of the joints, repairs and transverse cracks.

SHOULDER CONDITION

SHOULDER SEPARATION: Observe and record paved shoulder separation present.

SHOULDER CONDITION: Observe and record the paved shoulder condition.

DROP OFF: Observe and record the paved to unpaved shoulder drop off.

DRAINAGE: Observe and record the unpaved shoulder drainage.

EROSION: Observe and record the unpaved shoulder erosion.

CONSISTENCY

The "windshield" survey of rigid pavements determines whether the sample site is representative of the rest of the mile or test section. If significant distresses are observed during the "windshield" survey while none were seen in the detail survey, the rater shall place a "01" in the appropriate distress column at the lowest severity. Categories of distresses to record significant changes are but not limited to: joint and panel repairs, joint and panel spalls and slab cracking.

Figure 2

DATE	HWY	RP	LD	LT	LN	JR	JC	JS	SJ	C1	C2	PC	SP	PR	CS	CF	S	SC	DO	DR	ER	NSI	REMARKS
12162002	002	45900	A	TH	2					01					P							098	
12162002	002	45900	D	TH	2			01		01	01				P							088	
12162002	002	45980	A	TH	2	01	M	01												X		078	
12162002	002	45990	D	TH	2			01		01	01	L			P							085	
12162002	002	46035	A	TH	2	02	M	03		01					X			09				065	
12162002	002	46045	D	TH	2			01		01								09	X			087	
12162002	002	46075	A	TH	2													09	X		X	095	
12162002	002	46086	A	TH	2	01				01	02	L		01	G			09	X			077	
12162002	002	46086	D	TH	2	01	L	01		01	06	L		01	X			09	X			065	
12162002	002	46100	A	TH	2		L	03		02	01			03	G			09	X		X	059	
12162002	002	46100	D	TH	2	01	L	01		01	06	L	01	01	P			09	X	X		066	
12162002	002	46114	A	TH	2	01		02		02	02			01	P			09	X		X	066	
12162002	002	46200	A	TH	2	02		01		01	01			02	X	L	X	09	X			064	
12162002	002	46200	D	TH	2	01	L	01		06	01	L	01	01	X			09	X			067	
12162002	002	46488	A	TH	2													09	X			096	
12162002	002	46489	D	TH	2		L			01					G			08	X		X	094	
12162002	002	46500	A	TH	2		L			01	01				G			09	X		X	092	
12162002	008	14908	B	TH	1	01	L		X	02	08	L	01	01	X							058	
12162002	015	00000	B	TH	1		L			01		L			G				X			094	
12162002	015	00100	B	TH	1		L												X			096	
12162002	015	00600	B	TH	1		L			01					G				X			096	
12162002	015	00700	B	TH	1		L												X			096	
12162002	015	00881	B	TH	1																	100	
12162002	136	23700	B	TH	1		L			01	01				G		X	03				095	
12162002	L55K	00000	A	TH	2				X	01	01		01	01	X					X		088	
12162002	L55K	00000	D	TH	2			01	X	01	02				X							082	
12162002	L55W	00000	A	TH	2			01		01	03	L			P							084	
12162002	L55W	00000	D	TH	2			01														091	
12162002	L55W	00030	D	TH	2																	096	
12162002	L55W	00053	A	TH	2	01	L	03		01	07	L	02	01	X							050	
12162002	L55W	00053	D	TH	2		L	03		01	09	L	01		X							050	
12162002	S12B	00000	B	TH	1		L	03	X	01			02		P		X	07				067	
12162002	S13C	00000	B	TH	1			01		01	05				G	L			X			077	