Appendix 2

- **Surface Condition Rating (SCR) Manual**

SURFACE CONDITION RATING MANUAL

Version 4.2 - Alberta Transportation
Aug 7, 2003

PART 1 - INTRODUCTION

PART 2 - GENERAL

PART 3 - PAVEMENT DISTRESS RATING GUIDE

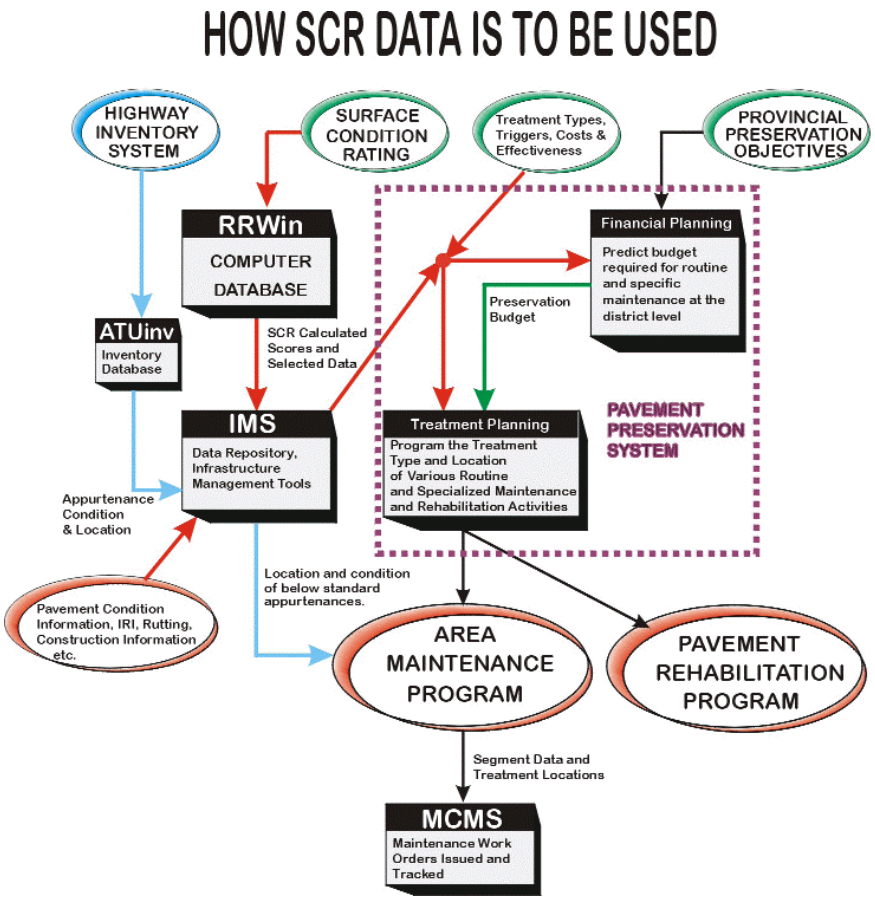
1.1 INTRODUCTION

This manual details the procedures to follow when surface condition rating (SCR) asphalt concrete pavements.

The information generated by the surface condition rating process is used to assist in the management of the provincial highway infrastructure. Information from this process is used in both the maintenance planning and rehab planning processes. Eventually, data from the SCR process will be stored in the Transportation Infrastructure Management System (TIMS) for use by the pavement preservation system (RoMaRa). At this time, historic SCR data is stored as ACCESS databases, and loaded into a proprietary database within RoMaRa. SCR data is used in the creation of needs based budgeting, performance objectives, performance measures, treatment selection and optimisation.

The surface condition information is being used to obtain a relative comparison of the various highway segment conditions throughout the province. This is accomplished by rating and recording the major distresses on the highway network and then using this data to classify the segments into an appropriate surface condition category. To date, SCR data collected in the field is processed using the RRWin data entry template. In the future, field data collected will be post-processed during entry into the corporate database in a standard SCR database format. This will transform individual field distress measurement into a overall distress scores for each segment.

Data output from Access can then be down loaded and used in various other applications. These applications can include financial and maintenance planning and administration tools like MCMS and RoMaRa. Financial planning tools will use the collected data to calculate the least cost of maintaining the road network to a given standard. Maintenance planning tools will optimise budget allocations by analysing road network conditions and then allocating the most cost-effective treatments to the most distressed segments of the road network. Maintenance planning tools will produce a schedule of treatments that will maximise the benefits obtained from a given available budget. These treatment planning applications can also be used as a tool to test the effects of different budgets and also to identify trouble spots in the road network.



In order to ensure reliable data for pavement management we must ensure that the SCR data is collected in a uniform and consistent manner. The surface condition rating process is to be carried out only by persons qualified to do so. All persons who are involved in the rating process must be certified as either a "RATER" or "RECORDER".

The duties of a RATER are to ensure that all data collected during the rating process is accurate and consistent. It is the RATER who is ultimately responsible for the measurement and evaluation of the pavements surface condition. The RATER must ensure that all data is collected and recorded according to the standards and procedures detailed in this manual.

The duties of a RECORDER are to record data accurately, assist the rater with measurements when required, tabulate the data and ensure that the rating forms are complete and ready to be entered into SCR database.

1.2 SAFETY AND TRAFFIC ACCOMMODATION

It is very important that raters and recorders consider their safety when rating surface conditions. This manual does not cover safety or traffic accommodation procedures. Standard department safety procedures shall be used at all times.

The rater/recorder qualification process does not include information or suggested procedures on traffic safety. Raters must be previously trained in safety and traffic accommodation and/or certified in this regard per Alberta Transportation's' standard policies.

Traffic accommodation for conducting surface condition ratings shall be in strict accordance with Standard Alberta Transportation Policies. Standard policy presents minimum requirements that may be exceeded.

1.3 EQUIPMENT REQUIREMENTS

In order to properly carry out all measurements required in this surface condition rating process, you will require the following pieces of equipment.

A. Vehicle equipped with an electronic odometer* (survey metre).
B. A 1.2 metre (4 foot) aluminium level (this will be used as a rut bar).
C. An aluminium rut wedge (supplied by Provincial Co-ordinator, Quality Assurance).
D. * Distance measuring wheel accurate to 1/10th of a metre (equipped with a brake if possible).
E. Chalk and spray paint (for marking gauging length boundaries and segments).
F. Clipboard, rating forms, pencils and calculator. Raters shall also carry the latest version of the Surface Condition Rating Manual with them during the rating process. Raters are to use registered copies of the SCR manual ONLY.
G. Hand held tally counter
H. Latest PMS reports, and IRI and rut data printouts.
I. Safety equipment as required.

*** Ensure that all equipment is calibrated on a regular basis according to the manufacturer's recommendations.**

PART 2.0 GENERAL PROCEDURES

2.1 SEGMENT NAMING CONVENTION

Road Name Descriptions

A segment identifying convention has been developed for the condition ratings. This convention is based on Alberta's Highway Number/Control system. This system has been modified to allow for segmenting of individual lanes, access roads and ramps.

The following information is required to identify a segment:

Two Character Highway Type Code:

Provincial Highway	:PH
Access Road	:AR
Park Road	:PR
Interchange	:IN
Weigh Scale	:WS

Three Digit Road Number:

Provincial Highways	:Highway Number
Access Road	:Departmental Access Road Number
Park Road	:Departmental Park Road Number
Interchange	:Departmental Interchange number*
Weigh Scale	:Highway number for scale site

Example - Highway 16 becomes `016'

Note: Some Interchange Numbers are 4 digit numbers. Use the first three digits of this number in this case. When you are using the first 3 digits of a 4-digit interchange number, you may end up with identical numbers for two different interchanges. In these cases, use the same number for each interchange BUT assign each interchange a unique route letter. (i.e. "A", "B", or "C")

One Character Route Letter:

The one character route letter is used for alternate route highways such as `16A' or `1A'. An `A' is put in this field for alternate routes, otherwise this field is left blank.

Two Digit Control Section Number:

The normal control section number is used in this field. In situations where a single segment may fall into two control sections, the "From" and "To" kms for each of the control sections is to be entered (see sample sheet on page 24). Access and Park roads which do not have their own control section number are

given the control section number of the primary or secondary highway they connect to. Interchanges are tied to the lowest control section number of the intersecting roadways. Scale sites are assigned the control section number for the site location.

5 Digit "From" Kilometre and 5 digit "To" Kilometre:

The "From" kilometre for the segment is recorded to the nearest metre. For example, 5.0 kilometres would be recorded as 05.000. Even though chainage is not normally accurate to the nearest metre, record to the nearest metre. Irrespective of the direction of travel, the "From" kilometre must always be less than the "To" kilometre. In other words, "From-To" is always based on the direction of increasing chainage, not the direction of vehicle travel.

Interchanges are assigned 0.00 for the "From" kilometre and assigned a "To" kilometre of the total length for all the ramps and roadways in the interchange in the lane kilometres.

Scale sites are handled similarly for driving lanes associated with the site. Parking areas are accounted for as additional area only.

For Access roads or other situations where the direction of chainage is not indicated, the intersection of the Access Road and the shoulder line of the main or secondary highway is considered 0.000 kilometres and chainage increases heading away from the main or secondary highway.

For segments that straddle the boundaries of two control sections, the second line of the "From km" and "To km" area is to be used to enter km information for the second control section.

One Character `Carriageway Code' and One Character `Lane Code':

The Carriageway Code indicates whether the segment is either to the left ('L'), to the right ('R'), or on the centreline ('C') of the control section. The Lane Code numbers the individual lanes from the centreline outward ('1', '2', '3', ...).

On a two-lane, undivided highway, a segment consisting of both lanes is given a 'C0' code. Individual lanes are segments as either 'R1' for the lane travelling in the direction of increasing chainage and 'L1' for the opposite direction. A deceleration or exit ramp segmented out separately would be either 'L2' or 'R2'.

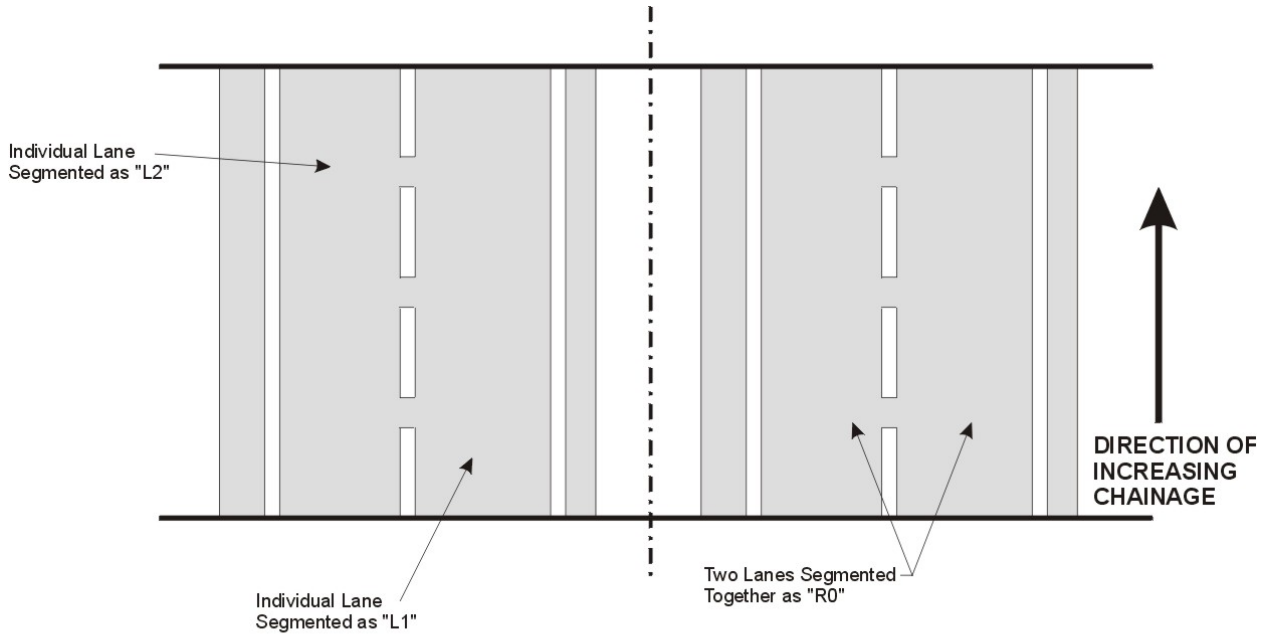
In a three-lane, undivided highway situation, two lanes in one direction are indicated as either 'L0' or 'R0' (depending on which direction has two lanes). Single lanes in either direction are indicated as either 'R1', 'R2', 'L1' or 'L2' (depending on direction). Note that the standard SCR form now has a checkbox that indicates that the segment contains both travel lanes and a passing / climbing lane data. This checkbox will not be ticked off when the segment data is only for travel lanes, or only for a passing / climbing lane.

Note that the standard SCR form now has a checkbox for divided highways.

On a four-lane divided highway, two-lane segments for traffic travelling in the direction of chainage would be ‘R0’. If these lanes were segmented out individually, they would be either ‘R1’ or ‘R2’. An acceleration lane would be ‘R3’ (if it was considered a separate segment, otherwise the driving lane area for this lane would be considered additional area). Segments in the opposite direction would be the same except ‘L’ would be used instead of ‘R’. If the divided highway segment contains both travel and a climbing / passing lane, both the ‘divided highway’ and ‘climbing / passing lane included’ checkboxes are ticked off.

Service roads using the same highway and control section number as the main lanes are designated as either ‘F’ for leFt and ‘G’ for riGht. These lanes are numbered as 0 if they are undivided or as 1 or 2 for individual lanes outward from the primary lanes (i.e. not outward from the centreline as for the primary lanes).

All components of each interchange are to be segmented out as one segment. The interchange segment will include all ramps associated with that interchange. The carriageway code assigned to the interchange will be C1.



The above diagram illustrates the carriageway and lane codes for four lane highways.

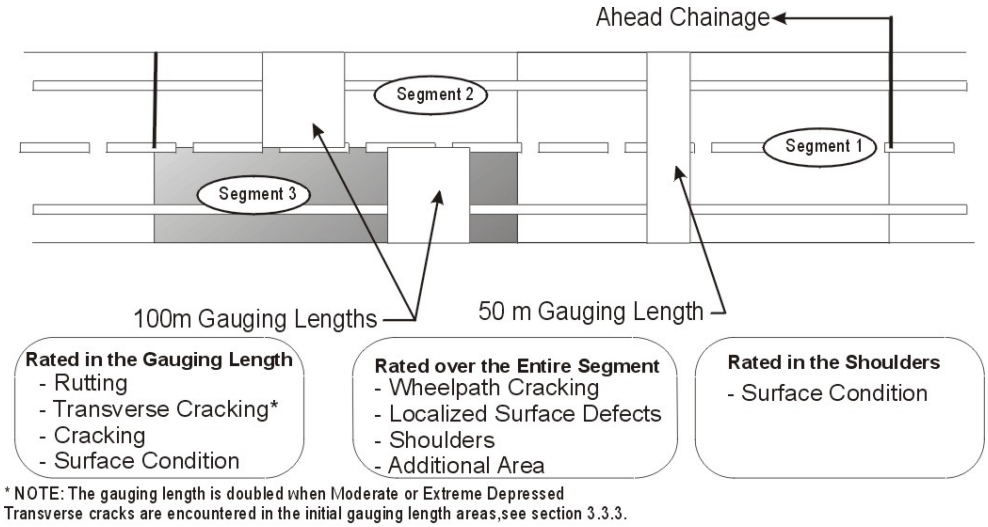
FIGURE 1

2.2 GENERAL RATING PROCEDURE

As of the SCR data collection for 2003, existing segment boundaries become permanent points. Every existing segment will keep the same boundaries, even if they become identical to adjacent segments after an overlay, surface treatment or other improvements. The only time that the Rater has to make new segment boundaries will be when an existing segment is broken up into two or more new, shorter segments.

As long as the gauging length is still representative of the segment, use the same gauging length as the previous year.

For highways that are not already segmented, the first step in rating is to divide the road into portions of roadway with consistent condition, performance history and maintenance costs over its length. Raters will then conduct a windshield survey of the segment and locate a representative **Gauging Length** within the segment where a more detailed distress survey is performed.



* NOTE: The gauging length is doubled when Moderate or Extreme Depressed Transverse cracks are encountered in the initial gauging length areas,see section 3.3.3.

FIGURE 2

For the windshield survey, the rating team covers the full length of the segment to assess those items which are rated over the entire segment. This is generally done for each lane unless the pavement is new and shows very few distresses, allowing two lanes to be rated at once. The speed at which the windshield survey is carried out is dependent on the amount of distress in the road surface and the experience of the raters. Typical rate of speed for the windshield survey is 5 - 15 km/hr. Information obtained during the windshield survey is recorded on page 3 of the condition rating form.

The rater then chooses a small gauging length within the segment that is representative or typical of the entire segment. Sample observations are made

of the Surface Condition, Rutting, Transverse Cracking and Cracking within the gauging length. All measurements are recorded as they are made on page 1 and page 2 of the surface condition rating form.

Surface Wetness: The effect of a slightly wet surface in optimizing the visibility of cracking is fairly obvious to even the casual observer and can often cause the most minute hairline cracking to stand out. On the other hand, a very wet road surface such as obtained during or shortly after a rainstorm camouflages all but severe cracking. Observations of cracking should be discontinued during rainstorms or other periods when the pavement surface is covered by "free" water. The ideal slightly wet surface condition is created when the road surface is dry except in and around individual cracks. In this case, water stored in the cracks during a rain will keep the adjacent pavement wet longer than in areas of no cracking. From the previous discussion, it would appear that pavement ratings would best be done shortly after a rainstorm. However, although a slightly wet surface allows highest crack visibility, a dry road condition represents the more normally encountered situation. Because of the need for a standardized rating procedure, do not rate when the pavement is more than slightly wet.(preferably dry).

Sun Angle: Illumination effects due to variations in vertical and horizontal sun angle are known to strongly affect crack visibility. Experience indicates that optimal lighting conditions are provided by a more or less head-on sun incidence. Frontal light tends to shade and therefore darken the visible side of crack segments which are perpendicular to the observer and most easily viewed. This has the net effect of maximizing apparent tone and texture differences between cracked and uncracked pavement. In general "over-the shoulder" lighting is usually considered a worst-case viewing condition. For the above reasons, the rater must be aware that the location and angle of sunlight might make certain conditions difficult to observe. The ability to properly see the conditions must be evaluated. It may be necessary to travel at a lower speed or evaluate the section "again" after reviewing it from the opposite direction.

Rater Fatigue: Viewing pavements can be an energy draining experience because of the continued concentration required to do a good job. For this reason most raters cannot work a full day doing only inspections. In this regard the raters can become "crack" happy ... calling all distresses the same thing. To avoid this situation, the day should be broken into different tasks, between rating, refresher breaks, calculating distress scores, equipment maintenance or other duties.

2.3 SEGMENTING GUIDELINES AND PROCEDURES

The primary purpose of segmenting is to establish segments of a control section where the condition is the same and where maintenance costs will be consistent throughout. Distresses must not vary significantly over the segments length. With a homogenous segment established, major work can be planned and budgets can be determined with some degree of accuracy. Proper segmenting is vital to the integrity of the entire condition based budgetary process. Segment length is an important issue especially for surfaces in moderate and poor condition. In these cases, the rater must pay particular attention to ensure that the segment is homogeneous.

STEP 1 The first place to start segmenting is with some research on the control section being considered. Pavement Management System (PMS) Reports should be used to research construction and rehab history as well as structure type. Obtain the current IRI readings from the PMS reports and record this data on the data sheets.

The rater should complete a “rough” segmenting based on the information obtained in step 1, prior to any field inspection. For example, a segment would typically have the same or similar IRI values throughout.

STEP 2 Maintenance history and the judgement and experience of Regional Staff and the Contract Maintenance Supervisor will all assist in identifying homogeneous segments. Using this information the segment boundaries determined in step 1 can be further refined.

STEP 3 A visual inspection of the road then follows to refine the segment limits. The rater will observe items such as local distresses, rutting, transverse crack spacing and depression to finalize segment boundaries. Once again, the key is to establish segments of a control section where the condition of the road and maintenance costs are relatively consistent throughout.

Refer to the hard “Rules of Segmenting” detailed in the following section 2.3.1.

To assist the rater with segmenting it is suggested that a “Segmenting Check Sheet” be used. By making and recording distress observations, the check sheet will allow the rater to clearly see when surface condition changes are significant enough to warrant a break in segments. Observations can be made on transverse crack frequency, rutting, cracking quantities, cracking types, and the presence of local defects. A sample check sheet can be found in Appendix “B”.

NOTE: Once segmenting has been completed the rater must record his reasons for segment selection on page three of the segment rating forms.

(See sample on page 26) Upon completion of segmenting, and prior to rating, the rater will be required to submit a list of segments to their Operations Manager for review and approval.

2.3.1 RULES OF SEGMENTING

- If conditions are ***significantly*** different between adjacent lanes, they should be considered as different segments. Examples include separation of the passing lanes and driving lanes on four lane highways or roads that have distinct loaded and unloaded directions. Adjacent lanes that may have different traffic loading must be considered during the segmenting exercise.

- Turning, passing, acceleration and climbing lanes should be included as part of the segment as long as they are homogeneous. The driving lane areas for these additional lanes should be measured and recorded as additional area on page 3 of the rating form.

- In situations where there is a two lane segment (i.e. L0, R0, C0) and the average rut depth of one lane differs from the other lane by more than seven millimetres, the lanes must be segmented out.

- The minimum length of an individual segment is to be 500 metres. In a situation where a local defective spot of 500 metres or less exists, it should be considered as a localised surface defect and should not be made into a new segment. ***Record the km location of all local defect areas over 100m in length in the "Remarks" field. Location and other defect details are to be recorded in the Localised Surface Defects field on page 3 of the rating form.***

NOTE: Access roads, park roads and service roads less than 500 metres long are to be counted as additional area and added to the adjacent segment. Details should be recorded in the "Remarks" field on page 3 of the rating form.

The maximum length of a segment is the length where no changes in condition exist. However, it is suggested that segments over 15kms be closely scrutinised to ensure that they are in fact homogeneous.

- All ramps and lanes associated with an individual interchange should be rated as a single segment.

- Segments must never cross over CMA boundaries. All segments must be broken at CMA boundaries.

- ***Starting in the 1999 rating season, segments no longer need to be broken at the boundaries between different structure types.*** (full depth asphalt, granular and soil cement). However to ensure a homogeneous

segment, if the surface condition of the pavement is significantly different after the point of structure change, a break in the segment will be required.

- Segments must be broken at seal coat boundaries between treated and untreated areas. This break is only made if the treatment change is longer than 500m.

- There is no requirement to segment out test sections however if the section is over 500m it is RECOMMENDED. If the test section is under 500m segmenting is not required but detailed observations of the test section should be recorded in the remarks area of the rating form. These observations should include;

  - type of test section
  - start and end km's
  - rutting, cracking and localised defect observations specific to the test section.

- Reasons for the break in segment boundaries must be listed in the comments section of the rating form. Prior to the rating of segments, the rater shall ensure that the OM has reviewed and approved the segment selection.

SEGMENT MARKERS

Segment Markers Correctly Installed At Edge Of Right-of-Way

2.4 GAUGING LENGTH

The gauging length is a sample length within a segment that is representative of the surface condition over the entire segment. This area is used to make exact measurements for the following distresses:

- Transverse Cracking
- Cracking
- Surface Texture

HARD RULES FOR ESTABLISHING THE GAUGING LENGTH

LENGTH: **On a segment where two lanes are being rated**, the gauging length will be **50 metres long** and will include both lanes and shoulders.

On segments where a single lane is being rated, the gauging length will be **100 metres long** and will include only a single lane and shoulder.

WIDTH: On a 50m gauging length the width is measured from edge of pavement to edge of pavement on a C0 segment. This is also the case for a two – lane L0 or R0 segment on a divided highway. On a 4 lane undivided highway the width would be measured from the edge of pavement to the centre of the centreline. (see Section 3.1, Figure 4)

On 100m gauging lengths the width is measured from the edge of pavement to the centre of the opposite line. (see Section 3.1,Figure 4)

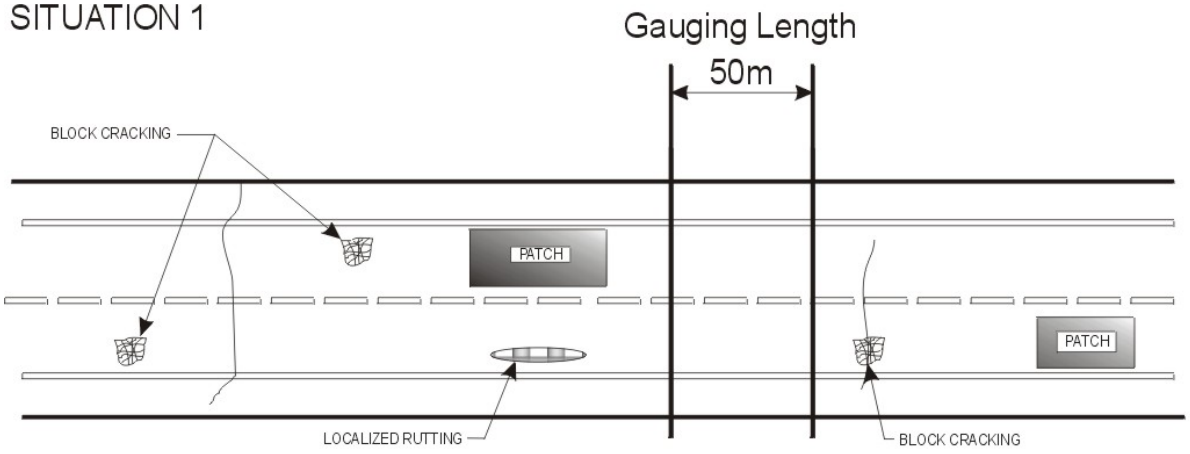
NOTES: 1. ***An exception to the guidelines for the gauging length will be made for measuring moderate and extreme depressed transverse cracks where the gauging length is doubled - see Section 3.3.3.***

2. ***Prior to 2002, gauging length width was measured only to the shoulder line. From 2002 on, gauging length measurements will be made out to the edge of pavement, not just to the shoulder line..***

If a gauging length cannot be found that truly represents the segment, it is possible that the segment needs to be broken down into shorter segments. The gauging length should not contain any localised surface defects.

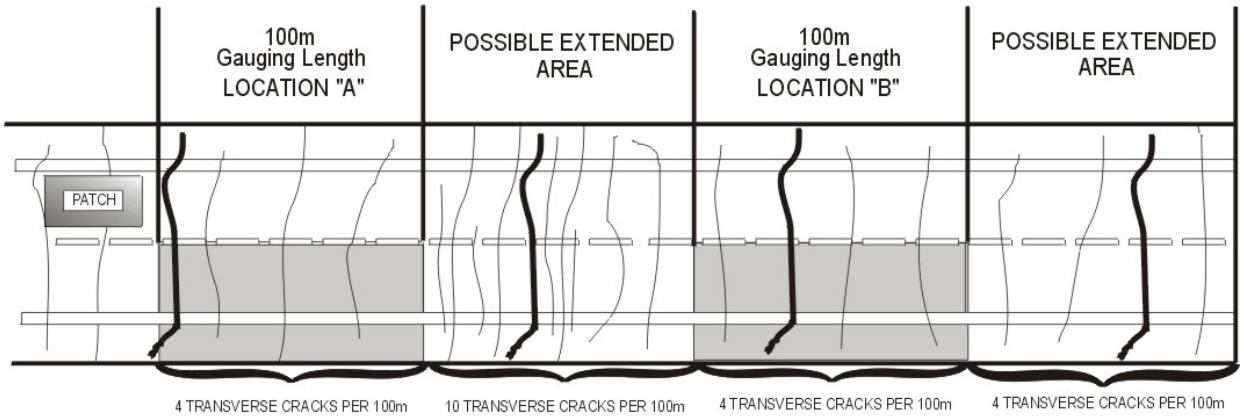
When picking a gauging length location, ensure that the location selected is a "safe" location. For example, do not select a gauging length location at the bottom or crest of a hill.

SITUATION 1



AVOID ALL LOCALIZED DEFECTS AND PATCHES AS THEY ARE NOT CONSTANT THROUGHOUT THE SEGMENT

SITUATION 2



WHEN PICKING A GAUGING LENGTH LOCATION KEEP IN MIND THAT IF YOU ENCOUNTER MODERATE OR EXTREME TRANSVERSE CRACKING YOU WILL BE REQUIRED TO DOUBLE THE GAUGING LENGTH.

YOU WILL THEREFORE WANT TO ENSURE THAT YOUR EXTENDED AREA IS ALSO REPRESENTATIVE OF THE ENTIRE SEGMENT.

QUESTION : WOULD LOCATION"A" BE A GOOD LOCATION FOR A GAUGING LENGTH ?

ANSWER : NO..... THE FREQUENCY OF TRANSVERSE CRACKS WITHIN THE EXTENDED AREA OF LOCATION "A" IS NOT REPRESENTATIVE OF THE ENTIRE SEGMENT. USING THIS LOCATION WOULD RESULT IN AN INACCURATE ASSESSMENT OF THE SEGMENT. THE BEST LOCATION FOR A GAUGING LENGTH WOULD BE LOCATION "B".

NOTE: IF YOU ARE UNABLE TO FIND A REPRESENTATIVE GAUGING LENGTH YOU MAY HAVE TO REVIEW THE SEGMENT LIMITS.

CHOOSING A GAUGING LENGTH

FIGURE 2A

2.5 USING THE SURFACE CONDITION RATING WORKSHEETS

The surface condition rating worksheet has been logically broken down into 3 sections. The content of these 3 sections and an explanation of how to fill out the surface condition rating worksheet is detailed below.

At the bottom of each page of the rating sheets is a box where the total sum of all numbers marked with "SUM" icons is recorded. This total is used during the data entry process as a data check to help ensure that the surface condition data has been entered properly. Failure to complete the “SUM” boxes will result in rejection of the data sheets.

The number of digits and decimal places recorded for the ratings are shown in the value boxes on rating form. The vertical lines represent digit separators and the small squares represent decimal places.

To view a sample of a completed rating worksheet, refer to page 24. Blank surface condition rating forms have been included at the end of this manual. Electronic copies of blank SCR forms are available for printing.

Section 1 SEGMENT INFORMATION

This section is used for assigning the segment a unique segment name. Complete the segment name portion of the worksheet according to the segment naming convention as described in Section 2.1.

FROM:

A description for this location can be recorded if one applies. At the time of data entry this field will be modified to also include the highway #, CS, and from km. This addition will allow the MCI’s to more accurately identify the segment locations within MCMS.

TO:

A description for this location can be recorded if one applies.

CHECKBOXES:

There are two checkboxes: if the segment is on one side of a divided highway, mark the “divided” box. If the segment contains both travel lanes and driving lanes, mark the “Climbing / Passing lanes included” box.

SEGMENT (IRI) INTERNATIONAL ROUGHNESS INDEX:

To assist the rater in the segmenting process, the average International Roughness Index (IRI) value is used in preliminary segmenting. Starting in 2002, the IRI of the segment does not need to be written on the SCR form.

Section 2 GAUGING LENGTH MEASUREMENTS

This section is used to enter all data which is collected within the segment's gauging length.

RATING DATE:

Record the date the segment was rated in month/day/year format as shown on the rating sheet.

GAUGING LENGTH AREA DETAILS:

Start:

Record the location within the segment where the gauging length starts. The location is based on the control section chainage. For segments that overlap CS boundaries ensure that you have entered the correct CS number.

Length:

Record the length of the gauging length. This length is 50 metres for two lane segments and 100 metres for one lane segments.

Width:

The width of the road at the gauging length is recorded. This width is the distance between the outside edges of the pavement for two lane segments and from the outside edge of the pavement to the middle of the centre stripe for one lane segments. This width always includes the shoulders.

SURFACE TEXTURE:

Enter the pick out value and circle the predominant surface condition according to measurements taken within the gauging length (see section 3.3.1 for measurement details). If the surface has been seal coated, indicate by checking the appropriate box, no further measurements are required.

RUTTING:

Record the 8 rut depth measurements taken in the gauging length. Calculate and enter the average rut depth for each lane of a two lane segment (only for L0, R0 or C0 segments)

TOTAL OF "SUM" BOXES FOR PAGE 1:

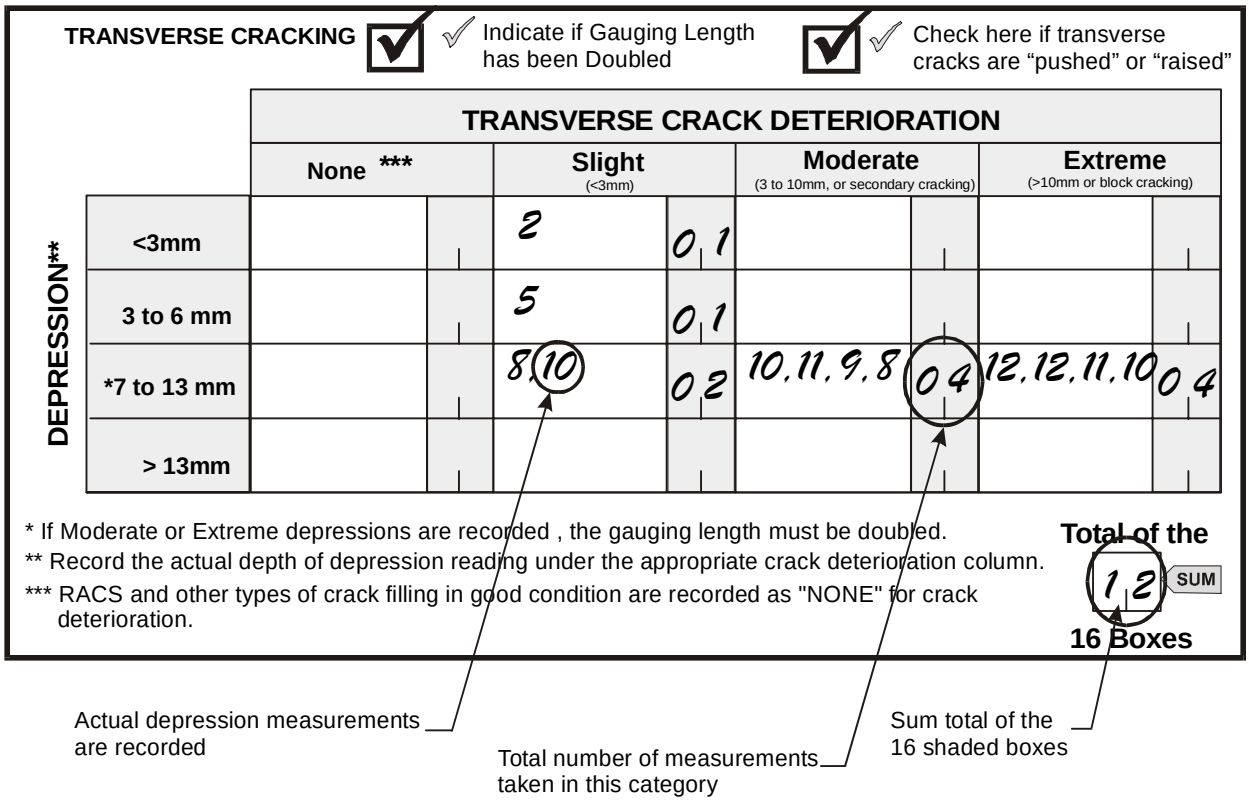
Add the numbers in all of the boxes on page 1 that have a "SUM" icon beside them and record the total at the bottom of the page. These include total rut measurements in each category and the gauging length, width and location.

CRACK FILL CHECK BOX:

Indicate with a check mark in this box if the segment has been crack filled this year.

TRANSVERSE CRACKING:

Each full lane width transverse crack is measured. Measurements are taken for crack depression and crack deterioration. The actual depth reading for a single transverse crack is recorded in the appropriate row (depth of depression) and in the appropriate column (crack deterioration). The number of measurements taken in each category are totalled in the shaded area within that category. Note that the actual depth readings are recorded in the chart but only the number of measurements taken are shown in the shaded areas.



Rout and crack sealed (RACS) firmly bonded to both sides of the rout, and filled cracks where the asphalt seal has not broken open are considered to be in good condition and are recorded as "None" for crack deterioration.

If, due to the presence of moderate or extreme depressed transverse cracks, the gauging length has been doubled, check the box labelled "Gauging Length Doubled".

Note: If you are required to double the gauging length do not change the length measurement that you have already entered on page 1 of the rating forms. Also, the presence of “raised” or

“pushed” cracks should be noted by placing a check mark in the appropriate check box.

CRACKING:

Record all cracking area measurements under the appropriate severity category. For cracking in the “None”, “Slight”, “Moderate” and “Extreme – Linear” categories, the measurements are to be written down as a length. Use the row tally area to write the individual measurements down. Total up the length of crack by severity and record a grand total to the nearest tenth.

For “Extreme - Alligator or Block” cracking a length and width for each occurrence is recorded. The presence of block or alligator cracking is also recorded by checking the appropriate check box.

RACS and conventional crack filling in good condition are recorded as "Repaired and Uncracked" (None) for crack deterioration.

The location of longitudinal cracking is to be recorded by placing a check mark in the appropriate box indicating the presence of centreline or centre of lane longitudinal cracking within the segment.

TOTAL OF "SUM" BOXES FOR PAGE 2:

Add the numbers in all of the boxes on page 2 that have a "SUM" icon beside them and record the total at the bottom of the page. These include "Total of the 16 Boxes." and "Repaired", "Slight", "Moderate" and "Extreme" cracking.

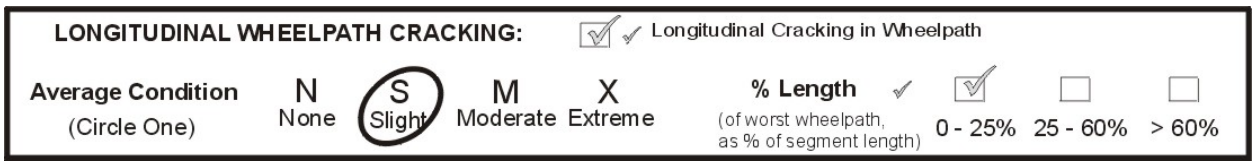
Section 3 WINDSHIELD SURVEY

This section is used to enter all data which is collected during the windshield survey. All data collected as part of the windshield survey is recorded on page 3 of the data sheets.

LONGITUDINAL WHEELPATH CRACKING

This area is used to enter data relating to the extent of longitudinal wheelpath cracking over the entire segment. Three check boxes are to be used in this section. These check boxes are used to indicate presence, extent, and % of segment length exhibiting longitudinal wheelpath cracking. The % segment length is estimated taking into account the length of the wheelpath showing the most severe longitudinal wheelpath cracking. The value to be

used is the percentage obtained by dividing the rough length of the cracking by the segment length, then multiplying by 100.



ADDITIONAL DRIVING LANE AREA:

Enter the additional pavement areas for the segment on this part of the form. The additional areas include additional DRIVING SURFACE AREAS which fall outside the defined segment width. Examples of additional areas are as follows: acceleration, deceleration, turning and passing lanes. (Also see segmenting guidelines, section 2.3) Additional areas does not necessarily mean that additional pavement has been added to the edge of the existing pavement (See Figure 3 below).

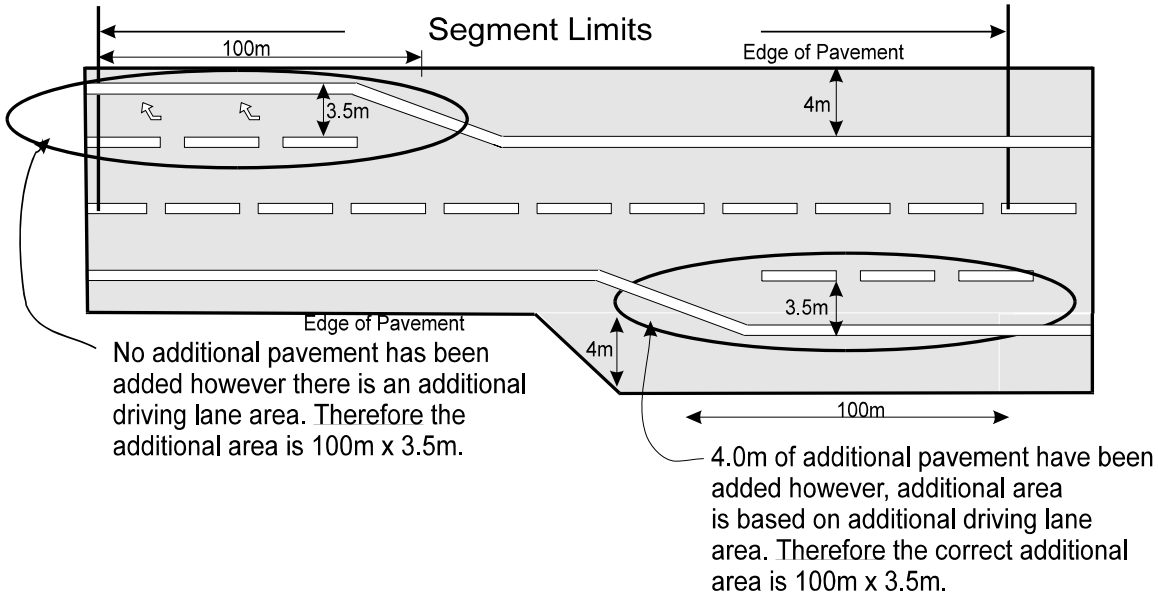
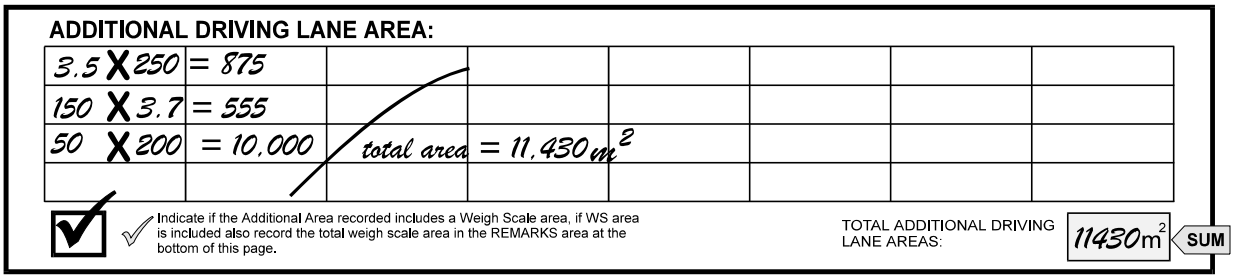


FIGURE 3

Example: if a roadway has a 4 metre shoulder and a 3.5 metre x 100 metre turning lane is painted onto the existing shoulder leaving 0.5 metre of pavement outside the shoulder line, the additional area is 3.5 x 100 metres, even though no additional pavement has been added.

ADDITIONAL AREA - RECORDING OF MEDIAN CROSS OVERS

For divided highways where there is a median cross over, the area of the paved cross over shall be measured and recorded as additional area. This will not include crossovers, which are classified as restricted use, such as maintenance crossovers. The area of the median cross over shall be recorded as “Additional Area” for the adjacent R1 segment.



RECORDING OF WEIGH SCALES

Effective 2002, all weigh scales are to be recorded as unique segments as long as the pavement at the scale is more than 500 metres long, OR there is a median between the weigh scale and the travel lanes. If the weigh scale is not eligible to be a separate segment, then it must be included as additional area within the adjacent. This applies to all weigh scales regardless of size or location.

LOCALIZED SURFACE DEFECTS:

Record all of the area estimates made over the segment length for each of the six distress categories listed in this section. In this area also record a pothole count, this count is taken over the entire segment length. Potholes are classified as areas less than 0.5 square metres and greater than 10 inches in diameter (hard hat size). Report totals for these items in the right hand box marked by the SUM icon.

The comments box is used to describe any localized condition that may need immediate or future (next 1-2 years) attention. ***Record the km location and details of all problem and local defect areas over 100m in length. Record this information in the comments area located immediately following the Localized Surface Defect quantities table on page 3 of the data sheets.*** For example, 200m of localized rutting in both wheel paths..... would be recorded as 200 x (1+1) or 400 m2 in the quantities table and *“200m of localized 30mm rutting in both the inner & outer wheel paths starts at km 8.6".*

SHOULDER INFORMATION AND DISTRESSES:

Record the length of shoulder with Extreme Surface Condition. Total up the individual measurements for each row and enter the total in the right hand box marked with the "SUM" icon.

Shoulder Width:

In this area you are required to enter the average shoulder width for the entire segment. For C0, R0 or L0 segments this will be the total of both the left and right shoulders.

REASON FOR BREAK IN SEGMENTS:

If the segment boundaries have not changed, put in "No Change" in this area of the form. Reasons for the new break in segment boundaries must be detailed in this area of the rating form. For example "***Break at start of segment due to change in the frequency and severity of transverse cracks." "Break at end of segment due to preventative maintenance surface treatment completed in 2003."*** Prior to the rating of segments, the rater shall ensure that the OM has reviewed and approved the segment selection.

GENERAL REMARKS:

Record any remarks that arise during the rating. These remarks can be anything from personal reminders to further descriptions of the distresses observed.

RATER:

Clearly print the first and last name of the rater for this segment.

RECORDER:

Clearly print the first and last name of the recorder for this segment.

RATER DATA SHEET VERIFICATION:

The rater shall indicate that he has verified the data recorded on these sheets as being correct. Once the rater has checked for recorder errors he must initial this area of the form. Forms missing the raters initials will not be accepted for data entry.

TOTAL OF "SUM" BOXES FOR PAGE 3:

Add the numbers in all of the boxes on page 3 that have a "SUM" icon beside them and record the sum at the bottom of the page. These include total of localized defects and shoulder distresses.

2003 Surface Condition Rating Worksheet

Alberta TRANSPORTATION

CMA Number: 09

SEGMENT INFORMATION

PH, AR, PR, IN, WS	ROAD #	ALPHA	CONTROL SECTION	FROM KILOMETER	TO KILOMETER	Carriageway Code C,R,L,F,g / Lane Code 0,1, 2, 3,..	3 DIGIT SEGMENT NUMBER
PH	039	-	08	16.500	35.180	C0	005
This line to be used only if the condition segment falls into two control sections. →			10	0.000	11.250		

From Description: PH039:08 km 16.50 C0 - Entrance to Goodine Estates

To Description: Entrance to Wilf's Gravel pit

☑ ☐ **Divided Highway** ☑ ☐ **Climbing/passing lane included**

GAUGING LENGTH MEASUREMENTS

Rating Date: 09/24/03 (m m d d y y)

Gauging Length Data — **Control Section**: 08

Start: 18.480 SUM **(km)** Length: 50 SUM **(50 or 100m)** Width {Including shoulders}: 7.4 SUM **(m)**

SURFACE TEXTURE (Circle One)

N	S	M	X
Near New	Slight	Moderate	Extreme
<10 pickouts per square m	10-40 pickouts per square m	41-80 pickouts per square m	>80 pickouts per square m

Actual # of "pickouts" counted: 5 SUM

RUTTING

	Wheelpath	Rut Depth Measurements	
**Lane 1 Start & End of 50m G.L.	Outer	6	4
	Inner	7	3
***Lane 2 Start & End of 50m G.L.	Inner	6	9
	Outer	5	7

Average* 5.0 SUM Lane 1

Average* 6.8 SUM Lane 2

*** THIS NOTE APPLIES TO 2 LANE SEGMENTS ONLY**

If the difference between the averages exceeds 9 mm, re-segmenting will be required.

☐ ☑ Check here if surface has been seal coated. (NOTE: No Surface Texture Rating required)

** For 1 Lane Segments (ie: 100m Gauging Length (G.L.))
Record Rut Readings at G.L. Start and 30m into the G.L.

*** For 1 Lane Segments (ie: 100m Gauging Length (G.L.))
Record Rut Readings at the 60m point and at the end of the G.L.

TOTAL OF SUM **BOXES THIS PAGE** 92.680

GAUGING LENGTH MEASUREMENTS.. Cont'd

Cracking Measurements.....

☐ ✓ Check here if segment has been crack filled this year.

TRANSVERSE CRACKING ☑ ✓ Indicate if Gauging Length has been Doubled ☐ ✓ Check here if transverse cracks are "pushed" or "raised"

DEPRESSION**	TRANSVERSE CRACK DETERIORATION							
	None***		Slight (<3mm)		Moderate (3 to 10mm, or secondary cracking)		Extreme (>10mm or block cracking)	
<3mm			2	0.1				
3 to 6 mm			5	0.1				
*7 to 13 mm			8, 10	0.2	10, 11, 9, 8 10	0.5	12, 12, 10, 11, 13	0.5
> 13mm								

* If Moderate or Extreme depressions are recorded , the gauging length must be doubled.

** Record the actual depth of depression reading under the appropriate crack deterioration column.

*** RACS and other types of crack filling in good condition are recorded as "NONE" for crack deterioration.

Total of the 16 Boxes 1.4 SUM

CRACKING

☐ ✓ **Longitudinal Cracking along Centerline**

☐ ✓ **Longitudinal Cracking at Center of Lane**

☐ ✓ **Block or Alligator Cracking Present**

REPAIRED (RACS and other types of crack filling in good condition are recorded as "REPAIRED" or "NONE" for crack deterioration)

3	0.9			
0.7				
3.6		8.2 lineal metres		

Total Lineal meters of NONE 8.20 m SUM

SLIGHT (<3 mm wide, single cracks)

3	1.6							
4	0.9							
1.2								
3.6								
0.1								
0.5								
1.0			15.9m lineal total					

Total Lineal metres of SLIGHT 15.9 m SUM

MODERATE (> 3mm wide, < 10mm wide, or branched cracking with >3 branches per m)

0.6								
1.1			2.0m lineal total					
0.3								

Total Lineal metres of MODERATE 2.0 m SUM

EXTREME (Singular or Branched Cracking > 10mm wide)

0.6	20	0.9						
5	6	1.2			33.7m lineal total			

Total Lineal metres of EXTREME cracking 33.7 m SUM

EXTREME (Well Interconnected Block or Alligator Cracking)

0.6 x 1.0	0.6 x 1.3			1.38 sq m total area				

Total **AREA** of well interconnected cracking 1.38 m^2 SUM

TOTAL OF SUM BOXES THIS PAGE 75.18

WINDSHIELD SURVEY

LONGITUDINAL WHEELPATH CRACKING: ☑ Longitudinal wheel path cracking in wheelpath

Deterioration Level: (Circle one) — **N** (None) **S** (Slight) **M** (Moderate) **X** (Extreme)

% Length (of worst wheelpath as % of segment length): ☑ 0 to 25% ☐ 25 to 60% ☐ 60 to 100%

ADDITIONAL DRIVING LANE AREA:

3.5 X 250 = 875						
150 X 3.7 = 555						
50 X 200 = 10,000	Total area = 11,430 sq m					
X						

TOTAL ADDITIONAL DRIVING LANE AREAS: 11,430 m^2 SUM

LOCALIZED SURFACE DEFECTS:

POT HOLE COUNT (each <0.5m^2)	1 1 1 11 1 11 1 1 1 1					12 COUNT SUM
Shoving:						m^2 SUM
Localized Rutting:	2 x 50	2 x 300				700 m^2 SUM
Moderate Local Roughness:	7.2 x 11	5 x 7.3	15 x 7.3	15 x 7.3	15 x 7.3	444.2 m^2 SUM
Extreme Local Roughness:	15 x 7.3					109.5 m^2 SUM
Localized Pavement Failure:	3 x 2					6.0 m^2 SUM
Localized Extreme Ravelling:	3 x 5					15.0 m^2 SUM

COMMENTS/LOCATIONS :
- Culvert dip at km 21.20
- 300m of localized rutting in both wheel tracks begins at km 4.1
- Moderate and extreme roughness due to extensive patching

SHOULDERS:

Extreme Surface Condition: 10, 7, 2, 10 7 — 36 m SUM

Shoulder Width: 2 ■ 2 SUM
(Total of both sides if "CO", "LO" or "RO" segment)

REASON FOR BREAK IN SEGMENTS:
- Segment break from previous year due to change in freq
- . and depression of transverse cracking

REMARKS:
- Longitudinal mat edge cracking throughout segment (moderate severity)
- Segment has extensive patching
- Additional area included a self weigh scale area of 200 x 50 = 10,000 sq m at km 5.6.
- All cracking on shoulder is extreme

	Last Name	First Name		Last Name	First Name
RATER:	Rater	Joe	**RECORDER:**	Recorder	Sam
		Print Clearly			Print Clearly

DATA SHEET CHECKED (RATER MUST INITIAL) JR

TOTAL OF SUM **BOXES THIS PAGE** 1 2 7 5 4 ■ 9

PART 3.0 PAVEMENT DISTRESS RATING GUIDE

3.1 WIDTH OF CONDITION SEGMENT

AC surfaces include conventional, full depth and soil cement structures. When rating pavements, the main lane is considered to end at the outside edge of the pavement (NOTE: prior to 2002, pavement width only went to the shoulder lines).

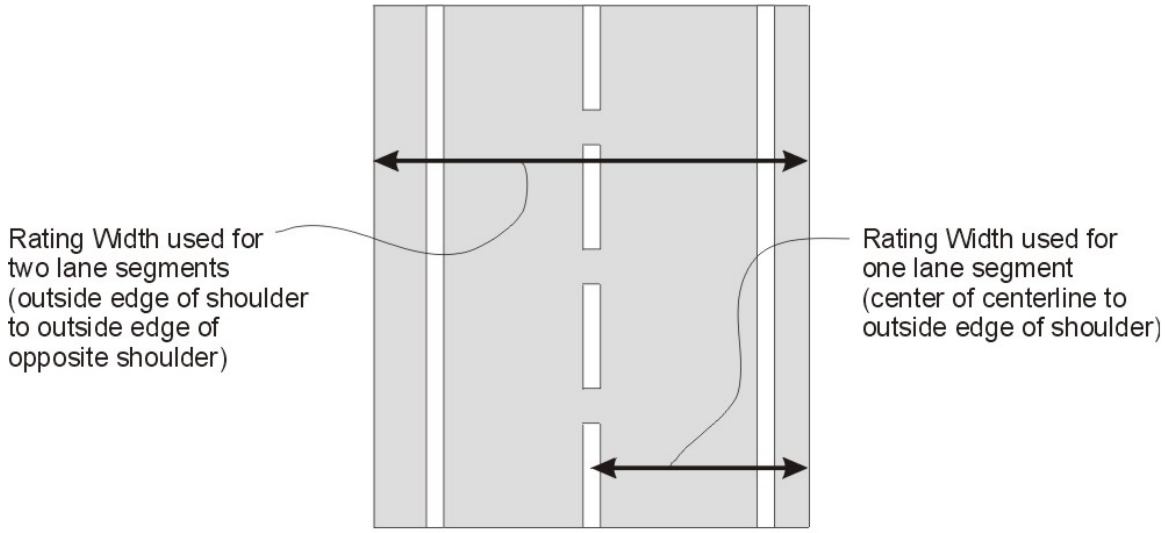


FIGURE4

MEASUREMENT
Width of the condition segment is measured to the nearest 0.1 m within the gauging length.

3.2 RUTTING

DEFINITION
Rutting is the longitudinal surface depression developing in the wheel paths due to repeated load applications. One wheel path depression may have single or double ruts.

Rutting is associated with continuous wheel path depressions rather than localized conditions. Localized rutting is considered as **Localized Surface Defects** - refer to Section 3.6.

MEASUREMENT

Rut depth measurements are taken and recorded in the gauging length only. Manual rut depth measurement will be required in the locations as shown in the following diagram. In total, 8 rut measurements are taken within the gauging length in both the inner and outer wheel paths.

Rut depths measurements are determined by using a 1.2 metre (4 foot) straight edge and a calibrated wedge as shown in the photos on the following pages.

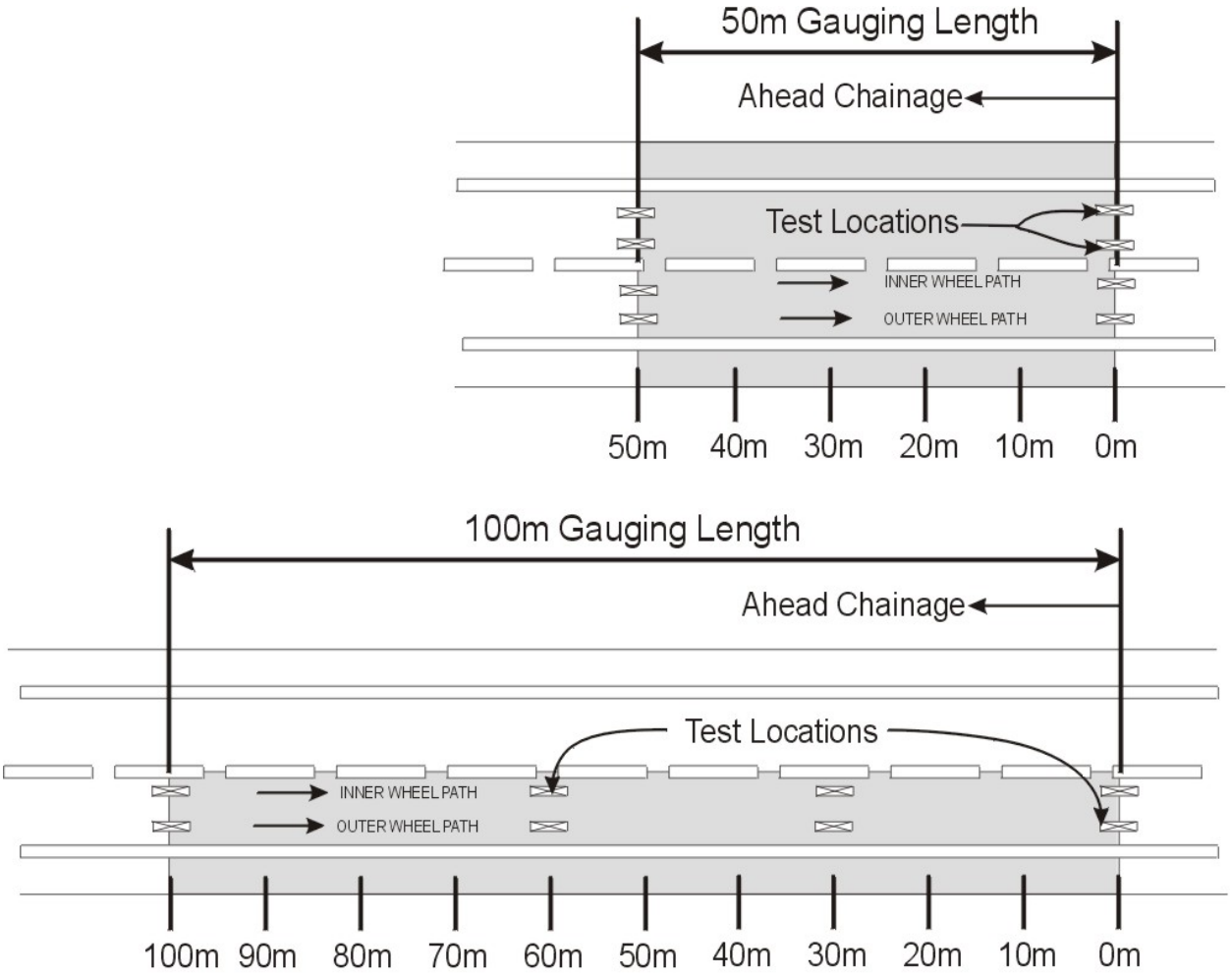


FIGURE 5

Measuring A Wheel Rut

CORRECT....Ensure To Level Is Centered Over The Wheel Rut, And Ensure The Deepest Reading Is Recorded For That Wheel Path

INCORRECT -- Level Is Not Centered Over Wheel Path, Incorrect Reading Obtained

SEVERITY

Rut depths less than 3 mm are recorded on the data form however they are not tallied in the summary box.

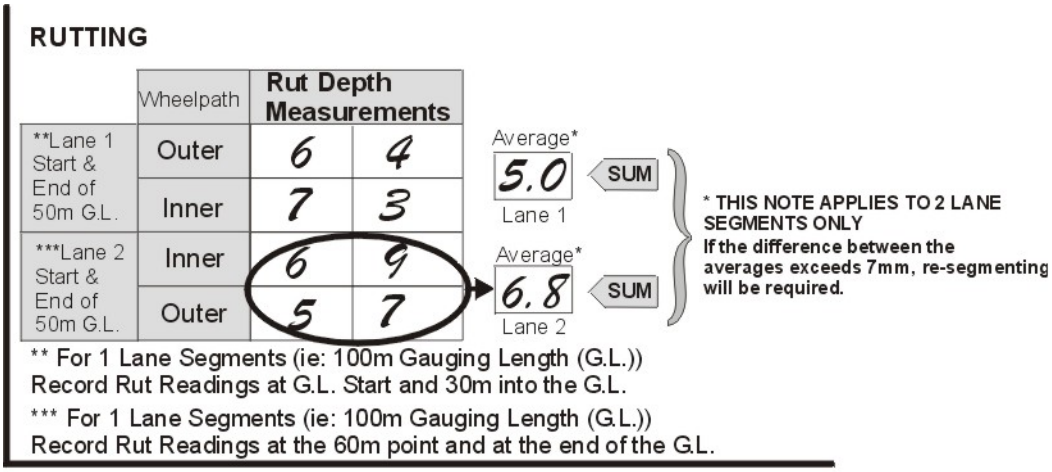
Slight
- rut depths of 3 to 8 mm

Moderate
- rut depths of 9 to 13 mm

Extreme
- rut depths greater than 13 mm

IMPORTANT NOTE: In situations where there is a two lane segment (i.e. L0, R0, C0) and the **average** rut depth of one lane differs from the adjacent lane by more than 7 mm, the lanes must be segmented out. In order to verify the proper segmenting has been done, the average rut depth per lane must be calculated and entered on page 1 of the condition rating form.

NOTE - Average rut depth is calculated for 2 lane segments only.



Sample data entry for a C0 segment. Rut measurements are averaged for each lane and entered into the appropriate "Lane Average" box.

FIGURE 6

3.3 TRANSVERSE CRACKING

DEFINITION

Transverse cracks run approximately at right angles to the pavement centerline and tend to be regularly spaced along the length of the road. Only full lane width transverse cracks are measured. Each full lane width transverse crack counts as one transverse crack. **Note: In cases where a full transverse crack has been patched in the wheel path, resulting in a non continuous crack, this crack shall be considered continuous and recorded as a full transverse crack.**

MEASUREMENT

Two separate features of transverse cracks are rated; the severity of crack deterioration and the depth of crack depression. The rut wedge and the 1.2m straight edge are used to complete these measurements.

3.3.1 CRACK DETERIORATION

Based on the following criteria, the severity of deterioration for each transverse crack is assigned.

SEVERITY

None -cracks that have been filled by conventional means or by RACS and are in good condition

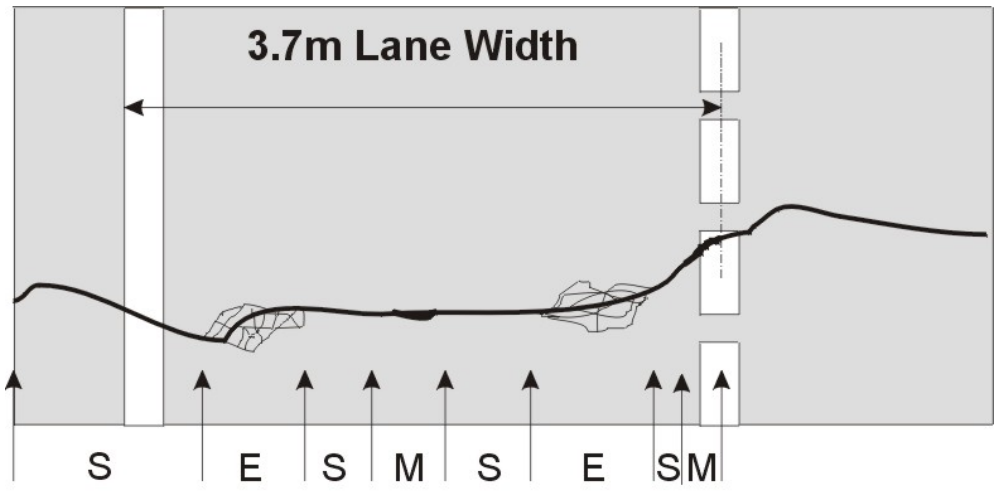
Slight -single cracks less than 3 mm wide
-cracks that have been filled by conventional means or by RACS and the sealant is no longer bonded

Moderate -single cracks of 3 to 10 mm
-secondary cracks
Extreme -single cracks greater than 10 mm wide
-multiple cracking
-spalling with considerable break-up and loss of material

Once you begin the process of rating transverse cracks you will quickly find that very few (if any) of the cracks will have the same level of deterioration across the full lane width.

To Assist The Rater In Determining A Cracks Overall Distress Rating
The Rater May Wish To Divide the Crack Into Its Various Levels Of Deterioration

Severe transverse crack with a 4 mm dip and a centre of lane crack



Slight = S = 1.4m Total Length
Moderate = M = 1.0m Total Length
Extreme = E = 1.3m Total Length

FIGURE 7

NOTE: Starting in 2002, the severity of transverse cracks will be based on the full pavement width, not just the part of the transverse crack within the driving lane.

In the diagram above, you see an example of a transverse crack that exhibits all three levels of deterioration. The largest single portion of the crack has a deterioration severity of SLIGHT (1.4m or 38% of the total crack). However, to call this crack SLIGHT would not give a true indication of the crack's actual severity. In situations like this, use the following hard rules to assign a deterioration severity to the crack.

RULE #1

Each transverse crack is classified under the most predominant severity. (Note: In cases where a full transverse crack has been patched only in the wheel path, resulting in a non continuous crack, this crack shall be considered continuous and recorded as a full transverse crack. When determining the deterioration of the crack, the repaired portion should be considered as slight.)

UNLESS

The combined total of moderate and extreme cracking exceeds 50% of the total crack length. If this is the case RULE #2 will apply.

RULE #2

If the combined total of moderate and extreme deterioration exceeds 50 % of the total crack length, the crack will be assigned a severity based on the most predominant condition within that combined portion of moderate and extreme cracking.

EXAMPLE

If we apply the above rules to our example on the previous page we would assign the crack a deterioration severity level of EXTREME.

RATIONALE: The cracks most predominant severity is "slight", however the combined total of the moderate and extreme sections is 62%. Because this is greater than 50%, rule 2 will apply. Using rule #2, the length of extreme (1.3m) exceeds the length of moderate (1.0m) therefore the crack will be rated as "EXTREME".

An Area Of “Blocking” Occurring Along A Transverse Crack Is To Be Considered As An Area Of Extreme Cracking

3.3.2 CRACK DEPRESSION

Depressions associated with transverse cracks decrease the riding comfort for the highway users. A 1.2 metre straight edge and a calibrated wedge are used to measure crack depression. Use the most severe depression measurement taken in the wheel paths for each transverse crack to determine its severity level. Transverse cracks that do not cover the full lane width are considered as Cracking, refer to Section 3.4. All transverse cracks, including cracks rated as “none” or repaired, must be measured for depression.

Severity

None
- raised* cracks or depressions less than 3 mm

Slight
- depressions from 3 to 6 mm

Moderate
- depressions from 7 to 13 mm

Extreme
- depressions greater than 13 mm

* Raised or pushed cracks are to be recorded as a ‘0" depression in the NONE severity category. The presence of raised cracks is also to be indicated by placing a check in the check box located at the top of page 2 of the rating sheets. See example shown on the following page.

Extent

Extent calculations are done within MS Access. Extent refers to the total number of cracks within each deterioration and depression severity.

Cracking Measurements.....

☑ Check here if segment has been crack filled this year.

TRANSVERSE CRACKING ☐ Indicate if Gauging Length has been Doubled ☑ Check here if transverse cracks are "pushed" or "raised"

DEPRESSION**	TRANSVERSE CRACK DETERIORATION							
	None***		Slight (<3mm)		Moderate (3 to 10mm, or secondary cracking)		Extreme (>10mm or block cracking)	
<3mm	0.0	02	2.3	02				
3 to 6 mm								
*7 to 13 mm								
> 13mm								

* If Moderate or Extreme depressions are recorded , the gauging length must be doubled.

** Record the actual depth of depression reading under the appropriate crack deterioration column.

*** RACS and other types of crack filling in good condition are recorded as "NONE" for crack deterioration.

Total of the 16 Boxes 04 SUM

CORRECT - Obtain The Crack's Maximum Depression - Centre The Level Over The Crack And Measure The Depression At A Point Directly Over the Crack

INCORRECT - This Reading Will Not Produce The Maximum Depression

INCORRECT - Do Not Drop The Wedge Down Into The Crack, Reading Will Be Exaggerated

CORRECT - Angle The Wedge Over The Crack To Obtain The Crack's Maximum Depression

3.3.3 GAUGING LENGTH MODIFICATION

(Applies When Measuring Transverse Cracking Only)

The gauging length for transverse cracks (only) will be as follows:

1. On a 50 metre gauging length, double the existing gauging length to 100 metres only when moderate or extreme depressed cracking is detected in the first 50 metres. This is done at the existing gauging site.

2. On a 100 metre gauging length, double the existing gauging length to 200 metres only when moderate or extreme depressed cracking is detected in the first 100 metres. This is done at the existing gauging site.

3. If either of the conditions indicated in point 1 or 2 exist, you are required to double the gauging length. If the gauging length has been doubled indicate you have done so by checking the "Doubled Gauging Length" box on page 2 of the rating forms.

IMPORTANT:

1. Do not change the gauging length measurement you have already entered on page 1 of the rating form.

2. All readings taken in the extended gauging length are recorded under the appropriate crack deterioration severity level and appropriate depression depth severity level just as they are for the normal gauging length.

3.4 CRACKING

DEFINITION: "Cracking" includes most types of pavement cracking mechanisms that affect the performance and structural capacity of a roadway as outlined below.

"Cracking" Includes:

a) Centerline cracking.
b) Block or alligator blocking.
c) Braided or tree branch cracking.
d) Short transverse cracking that does not extend across the lane.
e) All longitudinal cracking that occurs within the lane. This includes wheelpath cracking (longitudinal cracking parallel to centreline located in the wheelpath) and centre of lane cracking(longitudinal cracking parallel to the centreline located in the centre of the lane). The check box for longitudinal wheelpath cracking is now located in the Longitudinal Wheelpath Cracking section of the windshield survey. Within the gauging length however, the length of the wheelpath cracking is still to be measured as a part of general cracking, and should be recorded the same way.
f) Shoulder line cracking. All portions of the crack on the shoulder are to be recorded.
g) Cracking anywhere along a paving joint.(within the gauging length area only)

"Cracking" Does Not Include and Disregards:

h) Edge cracking.
i) Transverse cracking already counted under Section 3.3.

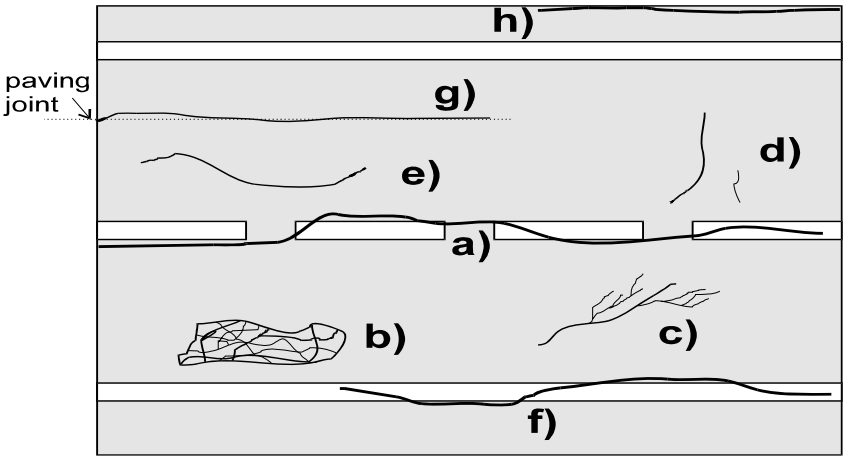


FIGURE 8

Areas of Block Cracking

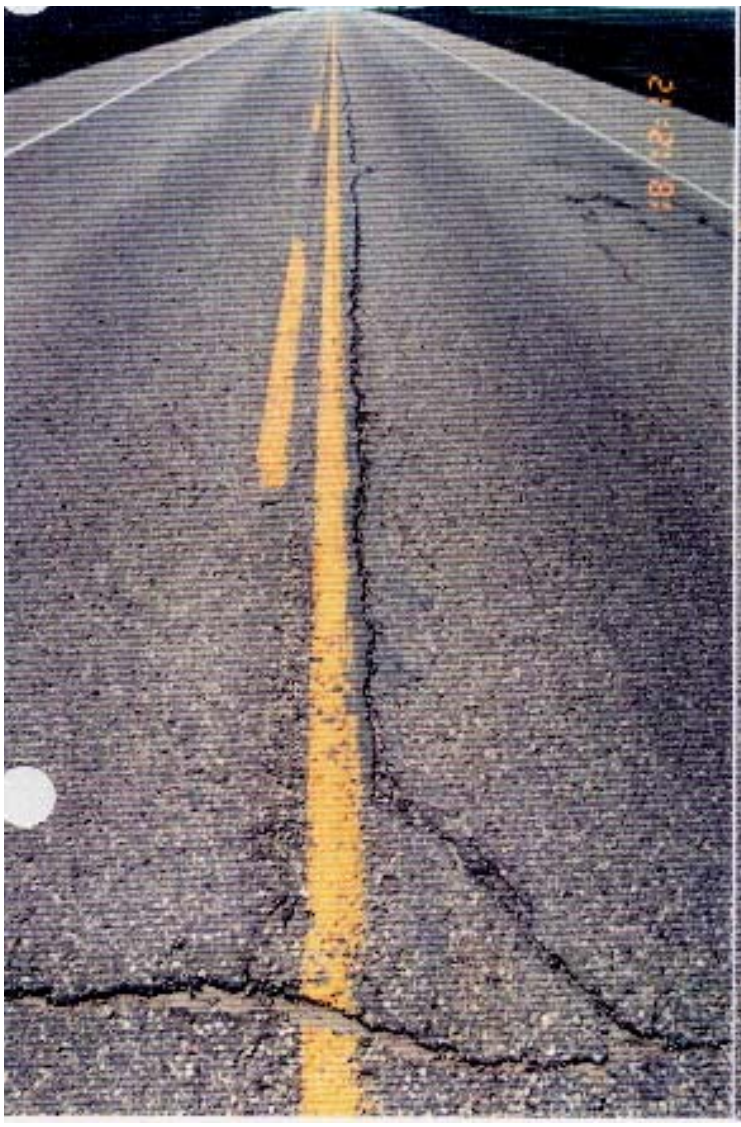
Chalked Area of Block Cracking

Area of Branched Cracking

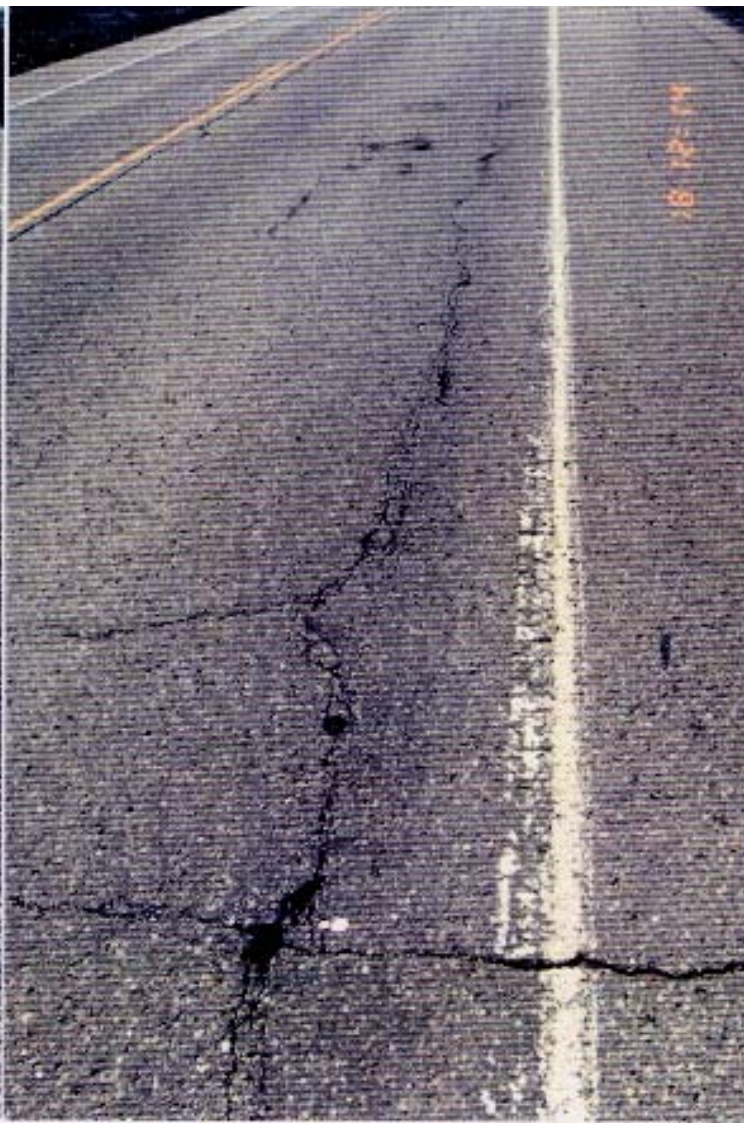
Cracking Seen Above is Paint Cracking Only And Should NOT Be Recorded

The above photos clearly display pavement cracking along the shoulder line. These cracks would be included in Gauging Length measurements.

Crack Does Not Completely Cross Driving Lane
The Crack is Therefore NOT A Transverse Crack, The Crack's Length Should Be Measured And Recorded As "Cracking" On Page 2 Of The Rating Form



Example of Centreline crack



Example of longitudinal crack in outer wheelpath

Longitudinal wheelpath cracking

Centre of Lane longitudinal cracking

MEASUREMENT

Measured over the Gauging Length as an area in square metres. Essentially all cracking, with the exception of full transverse cracking will be assigned a nominal width of 0.30m. A nominal area can then be calculated (0.3 m x length of crack). This applies to all severities, slight, moderate or extreme.

HARD RULE: When the lanes right and left of centerline have been segmented separately, centerline cracking is always recorded as part of the segment immediately right of the centerline.

NOTE: As of 2002, all shoulder cracks in the gauging length are measured

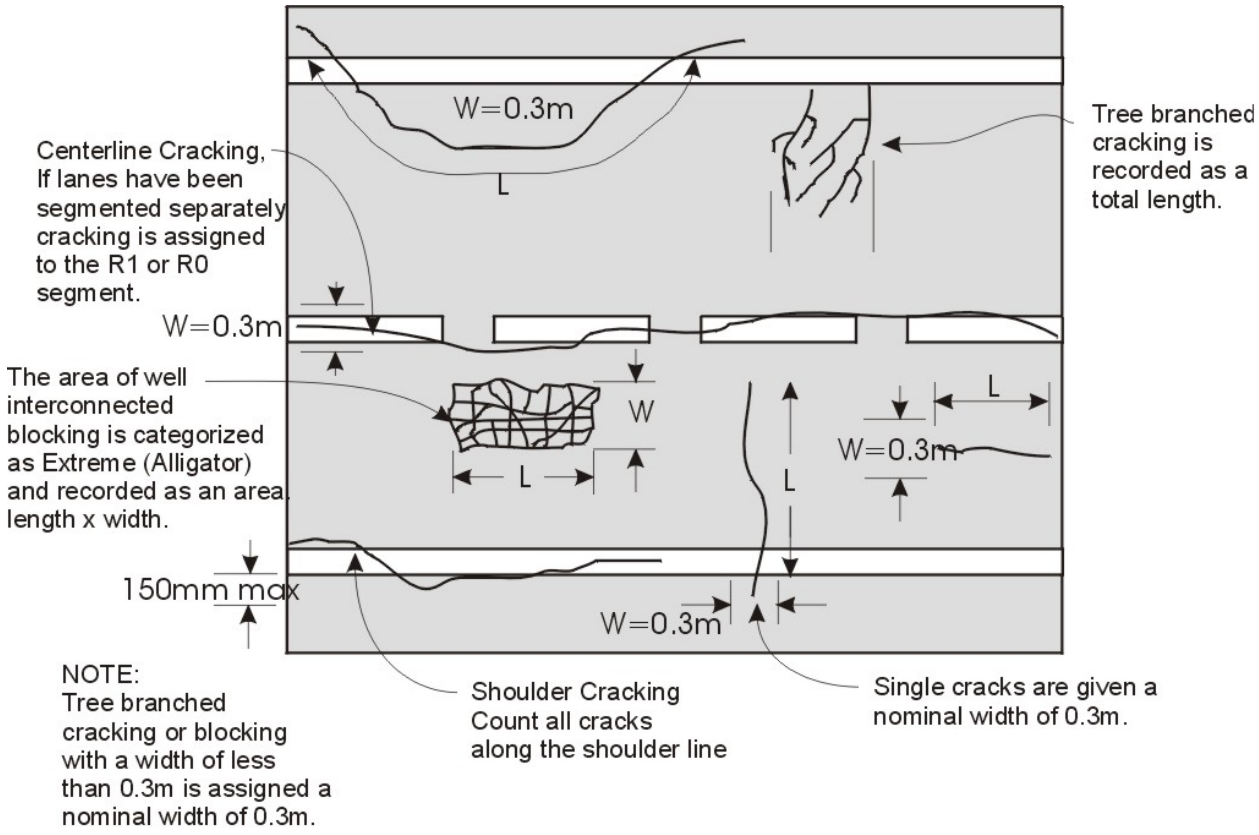


FIGURE 10

SEVERITY

Repaired

- repaired areas such as RACS and conventional crack sealing where no open cracking is evident. Bonds are intact.

Slight

- single cracks less than or equal to 3mm in width
- cracks that have been filled by conventional means or RACS…

- …and the sealant is no longer bonded

Moderate

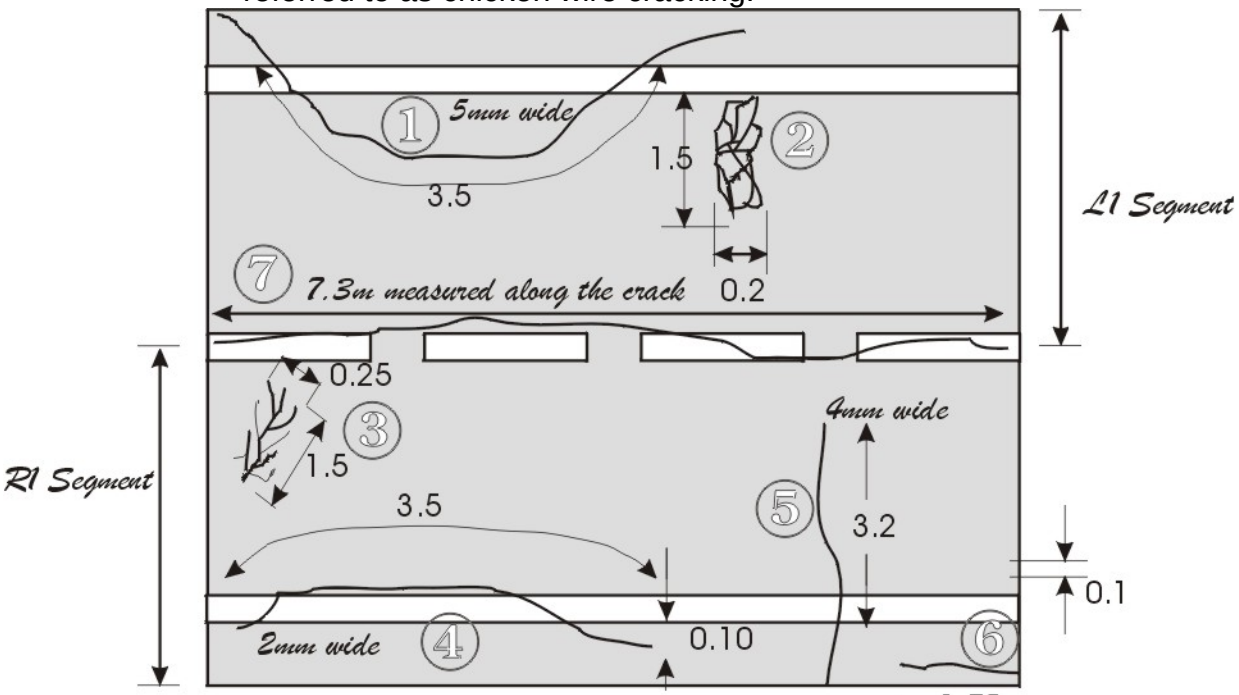
- all single cracks greater than 3mm wide but less than 10mm wide
- branched cracking with a branching interval of 3 or more branches per lineal metre

Extreme (Linear)

- all cracks greater than or equal to 10mm in width

Extreme (Well Interconnected Blocking)

- all well interconnected blocking or alligator cracking, sometimes referred to as chicken wire cracking.



1. This crack would be recorded as a moderate crack with an area of 3.5m x 0.3m.
2. This crack would be recorded as extreme cracking with an area of 1.5m x 0.3m.
3. This crack would be recorded as moderate cracking with an area of 1.5m x 0.3m.
4. This is a shoulder line crack. The entire length of this crack would recorded using a nominal width of 0.3m.
5. This crack would be recorded as moderate cracking with an area of 3.2m x 0.3m.
6. This crack on the shoulder it is counted as cracking.
7. This centerline crack would be assigned a 0.3m nominal width and 7.3m length and assigned to the R1 segment.

Sample Crack Measurements
FIGURE 11

3.5 PAVEMENT SURFACE

3.5.1 SURFACE TEXTURE/RAVELLING

DEFINITION

Surface texture is an assessment of the pavement surface with respect to ravelling, and loss of aggregate.

Ravelling is the progressive separation of aggregate particles from the pavement surface. Weathering, construction techniques, construction material and the abrasive action of traffic can all cause ravelling. Usually, the fine aggregate separates first and leaves little "pock marks" on the pavement surface. As the separation continues, more particles will break free leaving the pavement with a rough appearance.

Loss of aggregate in pavements occurs when single coarse aggregates are removed from the pavement surface creating a "pick out". For the purpose of this measurement, fine aggregate loss is not considered to be a pick out. Eventually, a coarse aggregate pick out will grow as the asphalt concrete mix is worn away from the hole. This defect is usually evenly distributed throughout the pavement surface.

MEASUREMENT

Measurement of this item is to be done in a location within the gauging length and should be representative of the entire segment. Using a chalk, draw a square 1m x 1m in size onto the pavement surface and count the number of "pick outs" within that area.

SEVERITY

None
- New or has a near new surface condition, less than 5 pick outs per square metre.
- All chip-sealed surfaces

Slight
- Fines are beginning to disappear along with some coarse aggregate
- 5 to 25 pick outs per square metre

Moderate
- Having an open textured appearance, pick outs fairly well spaced
- 26 to 50 pick outs per square metre

Extreme

- Very rough surface texture
- Greater than 50 pick outs per square metre

Photo Shows A Localized Area Of Pickouts
Pickout Measurement Should NOT Occur In This Area

Pickouts Consistent Throughout Segment
Good Location For Pickout Measurement

3.6 LOCALIZED SURFACE DEFECTS

DEFINITION

Localized surface defects are distresses that affect only a small portion of the driving surface and are not extensive enough to warrant re-segmentation of the road. This "catch-all" category is used to capture shoving, localized rutting, localized roughness and localized failures. These distresses should fall exclusively outside of the gauging length.

The measurement of localized surface defects shall be in square metres and recorded on page 3 of the rating form. The area is estimated over the entire segment length in square metres. Note: Only record localized defect areas that exceed 0.5 square metres. Areas under 0.5 square metres will be considered as being pot holes. The rater will complete a simple pot hole count over the entire segment, results are to be recorded on page 3 of the rating forms.

LOCALIZED SURFACE DISTRESS TYPES

3.6.1 SHOVING

Shoving is a form of plastic movement in the asphaltic concrete resulting in localized bulging of the pavement surface and may be accompanied by crescent shaped cracks. It is usually the result of poor stability in the asphaltic concrete. These commonly occur at points where traffic starts and stops or on steep grades where braking actions occur and wheel pull is generated when climbing. Severity levels are not required for shoving however the rater may wish to indicate severity in the remarks field.

3.6.2 LOCALIZED RUTTING

Localized rutting is a form of plastic movement in the asphaltic concrete resulting in localized pushing of the pavement surface laterally. It is usually the result of poor stability in the asphaltic concrete or subgrade layers. Only localized rutting greater than 35mm, or greater than 25mm accompanied by cracking is reported. The lineal length of localized rutting is measured and recorded for each rut. Each rut length is then factored by a 1m width to obtain the affected area.

3.6.3 LOCALIZED ROUGHNESS

Includes depressions or bumps that occur at bridge approaches, over culverts, at railway crossings or others. In comments box, report kilometre reading.

SEVERITY

Moderate

- Rough to a point where it makes a driver take notice and requires adjustment to steering or control of the vehicle. Immediate maintenance work is not be required however a patch may be required in a year's time.

Extreme

- Sharp change in profile of a road that is sufficiently abrupt to create a hazardous condition

- Warning signs are erected as per maintenance practices.

- Needs immediate attention

3.6.4 LOCALIZED PAVEMENT FAILURE

Includes localized failures of the pavement such as subgrade failures in soil cement base or localized extreme cracking. Any areas of pavement failures will be considered as extreme. However, the rater may wish to add additional remarks to describe the failure and degree of severity.

3.6.5 LOCALIZED AREAS OF EXTREME RAVELLING

Ravelling is the progressive separation of aggregate particles from the pavement surface. Weathering, construction techniques, construction material and the abrasive action of traffic can all cause ravelling. Usually, the fine aggregate separates first and leaves little "pock marks" on the pavement surface. As the separation continues, more particles will break free leaving the pavement with a rough appearance. Includes localized failures of the pavement such as subgrade failures in soil cement base or localized extreme cracking.

Only areas of extreme ravelling are recorded. Extreme ravelling can be identified when; aggregate and/or binder has worn away and the surface texture is very rough and pitted; considerable loss of coarse aggregate. The total area of extreme ravelling is tallied over the entire segment length.

Extreme Ravelling To Be Recorded As A Surface Defect

Extreme Ravelling To Be Recorded As A Surface Defect

Ravelling That Has Progressed To This Degree Shall Be Recorded As A Pavement Failure

3.7 SHOULDERS

DEFINITION

Shoulders include all surfaces that fall outside of the driving surface marked by the shoulder stripe. If conditions vary along a shoulder length, it is not re-segmented to reflect those changes.

MEASUREMENT

The length affected by surface distresses is measured over the entire segment and will be recorded in lineal metres.

The following distresses will be measured and recorded during the windshield survey: Extreme surface condition.

EXTENT

The extent is reported as the accumulated shoulder length where each distress exists.

SHOULDER DISTRESS TYPES

3.7.1 EXTREME SURFACE CONDITION

Record only the length of distress which is evident from the windshield survey, which would require a treatment and upon closer inspection would be considered extreme.

Longitudinal shoulder cracking

PART 4.0 USING SURFACE CONDITION RATING DATA

4.1 FORMULAS USED WITHIN THE SCR DATABASE

Constants Used in the database

Crack width - 0.3m per lineal metre of crack

Lane Width - 3.7m

Number of lanes:

Int((Gauging Width – Shoulder width) / Lane Width)

Segment Length:

(To - From) * 1000

Segment Area:

(Segment Length * Gauging Width) + Additional Area

Gauging Area:

Gauging Width * Gauging Length

4.2 SURFACE CONDITION RATING DISTRESS AREA/LENGTH CALCULATIONS

Percent Area Cracking:

(Area of Crack/Gauging area)*100

Done separately for Slight, Moderate and Extreme

Area Cracking per Segment:

Percent Area Cracking*(((Segment Length)*(Gauging Width) +Additional Area)

Done separately for Slight, Moderate and Extreme

Area of Rutting per Segment (No longer used):

Count of ruts / 20 * Segment Area * (Rut width / Lane Width)

Done separately for Slight, Moderate and Extreme

For the purpose of the following two calculations, if there is any moderate or extreme depressed transverse cracking, the gauging length area is doubled.

Percent Area of Transverse Cracking per Segment

{([Total Count of TC / 2] * Gauging Width * Crack Width) / Gauging Area } *100

Done separately for Slight, Moderate and Extreme

Length of Transverse Cracking per Segment

{(% area TC / 100) * Segment Area} / Crack Width

Done separately for Slight, Moderate and Extreme

4.3 SURFACE CONDITION RATING DISTRESS SCORE CALCULATIONS

Transverse Cracking Score (0-X3)

Severity: (0,S,M,X) Deterioration is based on predominant Column

Severity: (0,S,M,X) Depression is based on predominant Row

Combined Transverse Cracking Score		
Deterioration	**Depression**	**Score**
N	N	N
N	S	S
N	M	M
N	X	M
S	N	S
S	S	S
S	M	M
S	X	M

Combined Transverse Cracking Score		
Deterioration	**Depression**	**Score**
M	N	M
M	S	M
M	M	M
M	X	X
X	N	X
X	S	X
X	M	X
X	X	X

Extent is:

{(Total Number of TC * Crack Width * Lane Width) / [(Gauging Width – Shoulder Width) * Gauging Length] } * 100

Gauging Length is doubled if Moderate or Extreme Depression Cracking occurs.

Extent is derived from extent table

Shoulder Score (1-5)

The value is:

*[{Sum of lengths(Extreme Surface Condition) * Crack width} / Segment Area] * 100*

If Lanes=1 then Shoulder Length = Segment Length
If Lanes=2 then Shoulder Length = Segment Length * 2
Score is derived from value in extents

Surface Condition Score (1-5)

The value is:

*sum of defect areas/Segment Area * 100*

Score is derived from value in extents

Cracking Score (0-X3)

Severity (0,S,M,X) is based on predominant area
Extent is:
{Sum of Areas/(Segment Length * Gauging Width)} * 100

Extent is derived from extent table

Rutting Score (0-X3) (NOTE: No longer used)

Severity (0,S,M,X) is based on predominant Count
Extent is:
Sum of rutting counts equal to and greater than assigned severity.

Rutting width - 2m per lineal metre of driving lane
Depth of less than 3mm are discarded.
Extent is derived from extent table

EXTENT TABLE

Extents used in Condition Scores

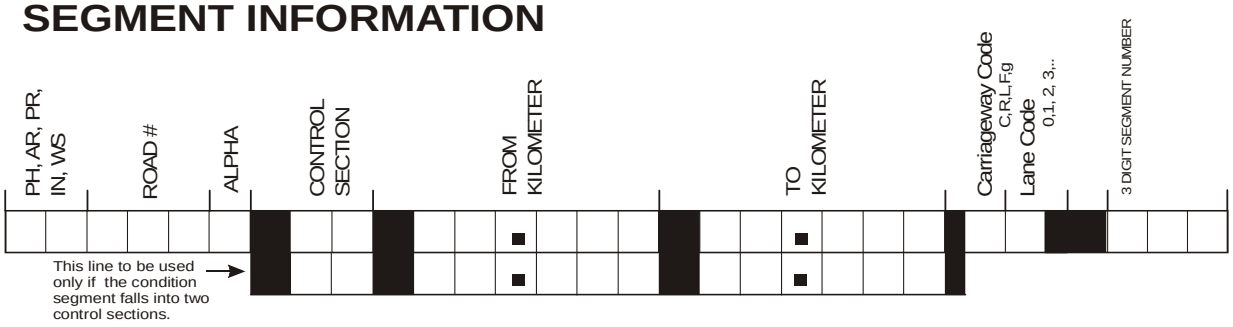
Score	Cracking	Transverse Cracking	Rutting	Shoulders	Local Pavement Defects
1	0 - 4	0 - 1	6 -12	0 – 1	0 - 1
2	5 -9	1.0 - 1.5	13 -16	1 – 5	1 - 5
3	10 -	1.5 -	17 - 20	5 – 10	5 - 10
4				10 – 20	10 - 20
5				20 -	20 -

2003 Surface Condition Rating Worksheet

Alberta TRANSPORTATION

CMA Number

SEGMENT INFORMATION



From Description

To Description

✓ ☐ **Divided Highway** ✓ ☐ **Climbing/passing lane included**

GAUGING LENGTH MEASUREMENTS

Rating Date: 0 3

m m d d y y

Gauging Length Data **Control Section**

Start: ■ SUM **(km)**

Length: SUM **(50 or 100m)**

Width: {Including shoulders}: ■ SUM **(m)**

SURFACE TEXTURE (Circle One)

N	S	M	X
Near New	Slight	Moderate	Extreme
<10 pickouts per square m	10-40 pickouts per square m	41-80 pickouts per square m	>80 pickouts per square m

Actual # of "pickouts" counted SUM

RUTTING

	Wheelpath	Rut Depth Measurements
**Lane 1 Start & End of 50m G.L.	Outer	
	Inner	
***Lane 2 Start & End of 50m G.L.	Inner	
	Outer	

Average* SUM Lane 1

Average* SUM Lane 2

*** THIS NOTE APPLIES TO 2 LANE SEGMENTS ONLY**

If the difference between the averages exceeds 7 mm, re-segmenting will be required.

☐ ✓ Check here if surface has been seal coated. (NOTE: No Surface Texture Rating required)

** For 1 Lane Segments (ie: 100m Gauging Length (G.L.))
Record Rut Readings at G.L. Start and 30m into the G.L.

*** For 1 Lane Segments (ie: 100m Gauging Length (G.L.))
Record Rut Readings at the 60m point and at the end of the G.L.

TOTAL OF SUM **BOXES THIS PAGE** ■

GAUGING LENGTH MEASUREMENTS.. Cont'd

Cracking Measurements.....

☐ ✓ Check here if segment has been crack filled this year.

TRANSVERSE CRACKING ☐ ✓ Indicate if Gauging Length has been Doubled ☐ ✓ Check here if transverse cracks are "pushed" or "raised"

DEPRESSION**	TRANSVERSE CRACK DETERIORATION							
	None***		Slight (<3mm)		Moderate (3 to 10mm, or secondary cracking)		Extreme (>10mm or block cracking)	
<3mm								
3 to 6 mm								
*7 to 13 mm								
> 13mm								

* If Moderate or Extreme depressions are recorded , the gauging length must be doubled.

** Record the actual depth of depression reading under the appropriate crack deterioration column.

*** RACS and other types of crack filling in good condition are recorded as "NONE" for crack deterioration.

Total of the ☐ SUM **16 Boxes**

CRACKING

☐ ✓ **Longitudinal Cracking along Centerline**

☐ ✓ **Longitudinal Cracking at Center of Lane**

☐ ✓ **Block or Alligator Cracking Present**

(RACS and other types of crack filling in good condition are recorded as "REPAIRED" or "NONE" for crack deterioration)

REPAIRED

Total Lineal meters of NONE ____ m SUM

SLIGHT (<3 mm wide, single cracks)

Total Lineal metres of SLIGHT ____ m SUM

MODERATE (> 3mm wide, < 10mm wide, or branched cracking with >3 branches per m)

Total Lineal metres of MODERATE ____ m SUM

EXTREME (Singular or Branched Cracking > 10mm wide)

Total Lineal metres of EXTREME cracking ____ m SUM

EXTREME (Well Interconnected Block or Alligator Cracking)

Total **AREA** of well interconnected cracking ____ m^2 SUM

TOTAL OF SUM **BOXES THIS PAGE** | | | | | | ■ | | | |

WINDSHIELD SURVEY

LONGITUDINAL WHEELPATH CRACKING:

☐ ✓ Longitudinal wheel path cracking in wheelpath

Deterioration Level: (Circle one)	N None	S Slight	M Moderate	X Extreme	% Length (of worst wheelpath as % of segment length)	✓ 0 to 25%	☐ 25 to 60%	☐ 60 to 100%

ADDITIONAL DRIVING LANE AREA:

X							
X							
X							
X							

TOTAL ADDITIONAL DRIVING LANE AREAS: m^2 SUM

LOCALIZED SURFACE DEFECTS:

POT HOLE COUNT (each <0.5m^2)						COUNT SUM
Shoving:						m^2 SUM
Localized Rutting:						m^2 SUM
Moderate Local Roughness:						m^2 SUM
Extreme Local Roughness:						m^2 SUM
Localized Pavement Failure:						m^2 SUM
Localized Extreme Ravelling:						m^2 SUM

COMMENTS/LOCATIONS :

SHOULDERS:

Extreme Surface Condition:						m SUM

Shoulder Width: ☐☐■☐ SUM

(Total of both sides if "CO", "LO" or "RO" segment)

REASON FOR BREAK IN SEGMENTS:

REMARKS:

	Last Name	First Name		Last Name	First Name
RATER:			**RECORDER:**		
	Print Clearly			Print Clearly	

DATA SHEET CHECKED (RATER MUST INITIAL) ☐

TOTAL OF SUM **BOXES THIS PAGE** ☐☐☐☐☐■☐☐☐