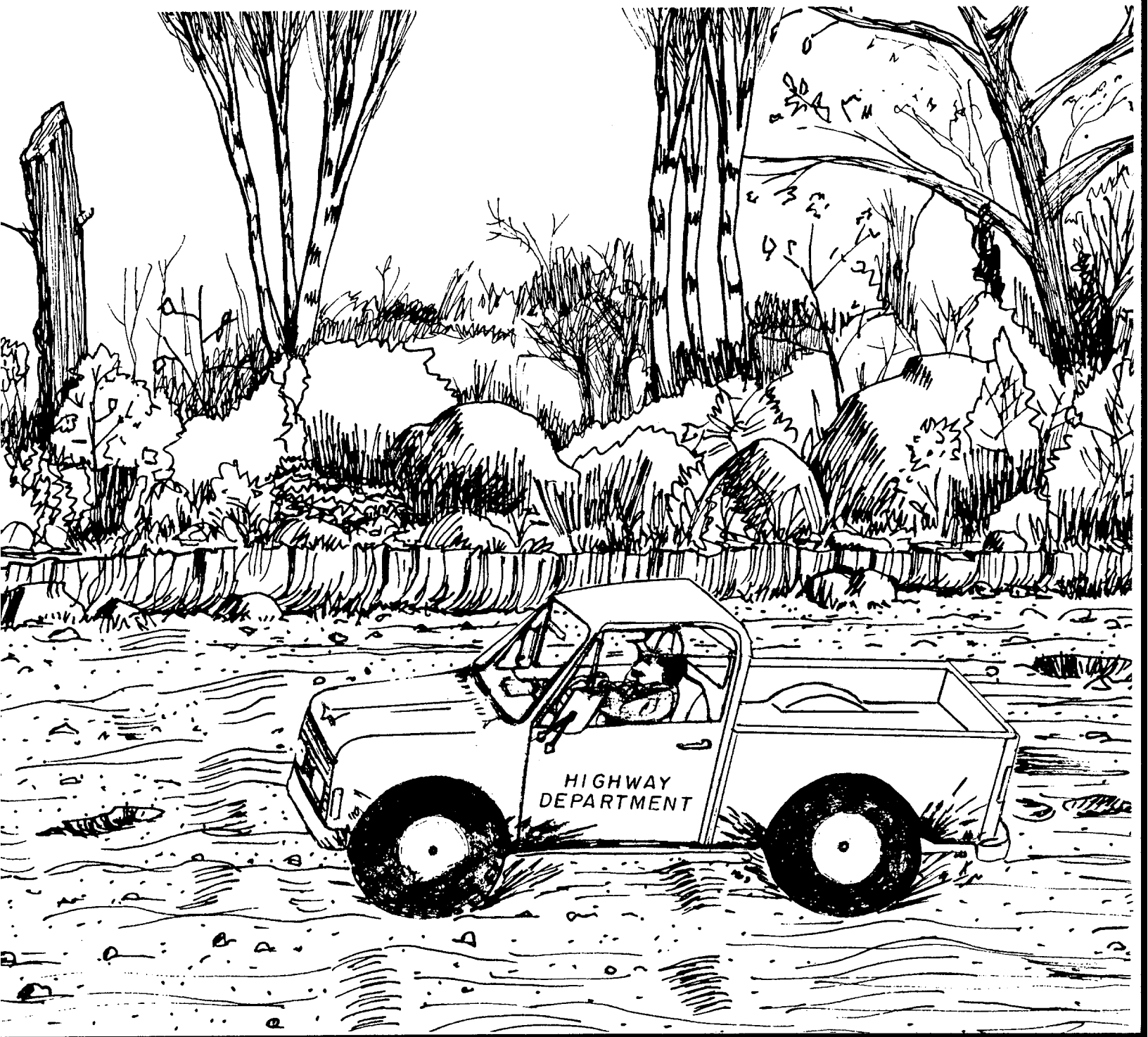
Special Report 87-15

August 1987
(Revised September 1988)

US Army Corps of Engineers
Cold Regions Research & Engineering Laboratory

Rating Unsurfaced Roads
A field manual for measuring maintenance problems

R.A. Eaton, S. Gerard and D.W. Cate



PREFACE

This report was prepared by Robert A. Eaton, Civil Engineer, Experimental Engineering Division, U.S. Army Cold Regions Research and Engineering Laboratory (CRREL); Sidney Gerard, Senior Scientist, Science and Technology Corporation; and David W. Cate, Technical Publications Editor, Technical Communications Branch, Information Management Division, CRREL.

Partial funding for this project was provided by the Federal Highway Administration, under Rural Transportation Assistance Program Contract No. DTFH61-84-Y-00891, Project No. 29 "Revising the PAVER Pavement Management System for Use in Unpaved Roads." Funding was also provided by the Army Facilities Engineering Support Agency; the Office of the Chief of Engineers, Army Corps of Engineers; the Army Training and Doctrine Command (TRADOC); and the Army Forces Command (FORSCOM).

The authors thank the following rating panel members for their help in the field validation phase:

S. Alford, U.S. Army Engineer Waterways Experiment Station
R. Beaucham, U.S. Army Facilities Engineering Support Agency
W. Benton, Ft Stewart, Georgia
E. Blackmon, U.S. Army Construction Engineering Research Lab
R. Hauger, Town of Hanover, New Hampshire
N. J. LeBrun, Dept of Transportation, State of New Hampshire
K. Leland, U.S. Army Engineer District, Tulsa
R. McDeavitt, Hardin County, Kentucky
F. Oler, U.S. Army Engineer District, Tulsa
D. Staab, U.S. Army Engineer District, Seattle
R. Stith, Ft Knox, Kentucky.

Special thanks are due to Dr. Mohamed Shahin and Kathryn Cation of the U.S. Army Construction Engineering Research Laboratory, Champaign, Illinois, for ensuring that this method is compatible with the PAVER pavement management system. The authors also thank Dr. Richard Berg, Judith Bettis, Mark Hardenberg, Karen Henry, Dr. Vincent Janoo, Robert Lindsay, William Quinn and Edmund Wright for reviewing the original manuscript and Dr. Donald Walker for providing a photograph of dust.

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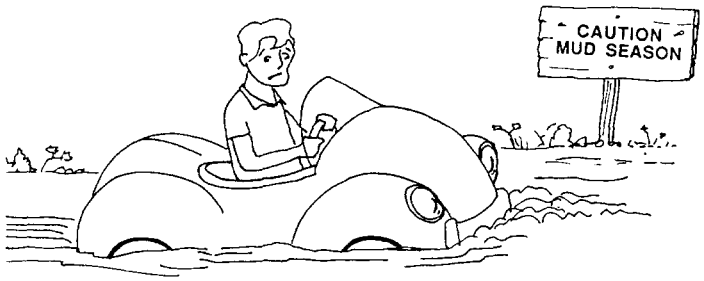
RATING UNSURFACED ROADS
A field manual for measuring maintenance problems

Robert Eaton, Sidney Gerard and David Cate

INTRODUCTION

About two-thirds of the highways in the United States and 90% of all roads worldwide are unsurfaced or lightly surfaced low-volume roads. Many systems are being used to manage the maintenance of these roads. In this manual we describe a method that can help local highway agencies manage their unsurfaced roads.* The result of the system is a rating for each section of road indicating how badly that section needs repairs.

If you are managing unsurfaced roads, this system will help you keep your road system in good shape by identifying problem areas. Neglected problem areas can deteriorate quickly and require costly major repairs. The ratings from this system will help you decide how to divide up your maintenance budget so that you can get more for your money.



An unsurfaced road is any road that does not have portland cement concrete, asphalt concrete or any other surface treatment. Some agencies consider gravel to be a surfacing material; for the purposes of this manual a gravel road is an unsurfaced road.

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* This system is designed to work with the computerized PAVER and MicroPAVER pavement management systems developed by the U.S. Army Corps of Engineers, but it can also be used without a computer.

UNSURFACED ROAD INSPECTION SHEET

Branch Potato Hill Central Date 7/15/86

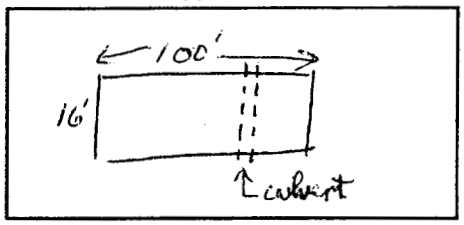
Section PH-2 Inspector R. Eaton

Sample Unit 1 Area of Sample 1600

DISTRESS TYPES

1. Improper Cross Section (linear feet)
2. Inadequate Roadside Drainage (linear feet)
3. Corrugations (square feet)
4. Dust
5. Potholes (number)
6. Ruts (square feet)
7. Loose Aggregate (linear feet)

SKETCH



DISTRESS QUANTITY AND SEVERITY

Type		1	2	3	4	5	6	7
Quantity and Severity	L	100			✓	1		100
	M		100			1		
	H		100					25

URCI CALCULATION

Distress Type	Density	Severity	Deduct Value
1	6.3	L	14
2	6.3	M	15
2	6.3	H	19
4		L	2
5	0.1	L	2
5	0.1	M	4
7	6.3	L	10
7	1.6	H	8

Total Deduct Value = 74

q = 5

URCI = 63 RATING = good

REMARKS:

erosion around culvert

Unsurfaced roads are managed much differently from paved roads. Maintenance is needed much more often on unsurfaced roads. Long-term planning for a paved road would be for 5–20 years; for an unsurfaced road it would be for 1–2 years. Normally you maintain an unsurfaced road by blading it with a road grader three or four times a year. The road conditions may change quite a bit between gradings because of traffic and weather. Planning or scheduling of maintenance is done once a year.

HOW THE METHOD WORKS

The method for rating the condition of unsurfaced roads has three steps:

1. Dividing the road network into sections;
2. Inspecting the sections and identifying problems;
3. Calculating ratings that indicate the condition for each section.

Each step is very important and must be done carefully. On the left is a sample rating sheet—what you'll end up with when you're done. The rest of this manual describes how to fill out this sheet and come up with a rating.

STEP ONE: DIVIDING UP THE ROAD NETWORK

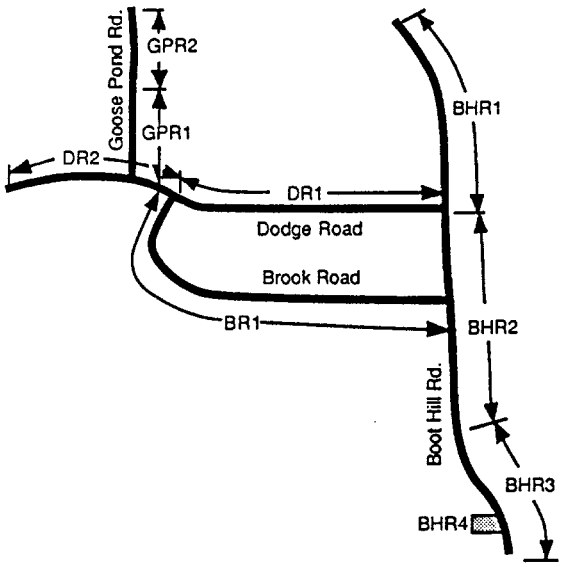
Before you do the field work, you will need to divide your road network into manageable units. You will only have to do this the first time you use the system. After that, you should always use the same divisions.

The area to be divided—the road network—includes all the unsurfaced roads that you manage. Don't forget parking areas and seasonal roads. The road network is divided into ***branches***, each of which is a single area, such as a road or parking area. A ***section*** is a part of a branch with consistent characteristics. The smallest division is the ***sample unit***, where the actual inspection and measurements are done.

Dividing the Network into Branches

Branches are usually large units, such as a road many miles long. Sometimes they are smaller, such as a parking lot. The idea is to break up the road network into major recognizable units.

If part of a branch is used by heavy vehicles, make that part a separate section.



Your section map might look like this.

The easiest way to identify branches is to use existing names, such as Beantown Road or Poverty Lane. If an area does not have a name, you should give it one.

Dividing the Branches into Sections

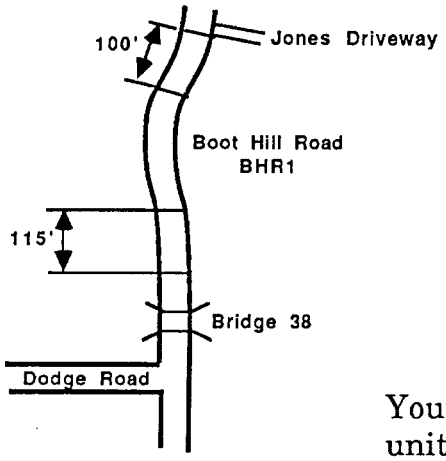
Since branches are large, they rarely have the same maintenance needs along their entire length. Sections, though, are pieces of branches that are uniform. Here are some things to look for when you are dividing branches into sections.

- *Structure*. The thickness and type of surface material should be the same within a section. Information on structure can be collected by searching construction records or observing road excavations. Coring or digging test pits may be necessary to determine the structure or to verify information from records.
- *Traffic*. The volume of traffic and the traffic loading should be consistent within each section. For example, if part of a road is used heavily by log trucks and another part is a seasonal camp road, the two parts should be put into separate sections.
- *Construction history*. All parts of a section should have been built at the same time. If a road is constructed a piece at a time, divide it into separate sections corresponding to the dates of construction. Areas that have received major repair work should also be separate sections or additional sample units.
- *Unsurfaced road rank*. If a road changes from second class to third class, a section division should be made.
- *Drainage and shoulders*. The shoulder type and drainage facilities should be consistent within a section.

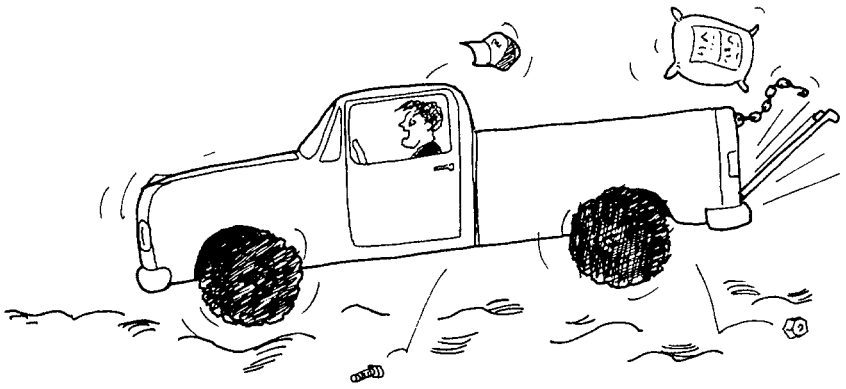
Parking areas, storage areas or areas where materials have been placed for testing are usually considered separate sections, but they may be subdivided. For example, if a parking lot has a well-defined driveway, make it a separate section; the division would be based on traffic patterns and use. Field observations will help in deciding how to divide an area like this.

Once you have divided the branches into sections, identify each section on a map. This is important, because you will be using the same sections every time you rate your roads.

To get a fair estimate of the condition of this road, you would want to include some of these potholes in the sample unit.



Your map of sample units might look like this.



The "windshield inspection" will help you keep track of your worst road sections.

Dividing the Sections into Sample Units

Sample units are the smallest division of the road network. They are the segments where you will make the actual measurements for determining the road condition.

In general, sample units are 100 feet long. If the road is narrower than 15 feet, the length should be increased. If the road is wider than 35 feet, the length should be shortened. Each sample unit should have an area of about 2500 square feet, but it can vary from 1500 to 3500 square feet.

You will need to use some judgment in selecting the sample units. Try to choose an area to sample that is typical of the whole section. For example, if the section has drainage problems along part of its length, try to include some of that in the sample unit. The idea is to choose sample units so that the measurements will give a fair estimate for the entire section.

If a small part of the section has particularly severe problems, make that part a special sample unit. (Make sure to note this on the inspection sheet, and don't use the rating for this unit when you calculate the average for the section.)

In general, only two sample units per mile are needed. If the road is less than 1/2 mile long, one sample unit should be enough.

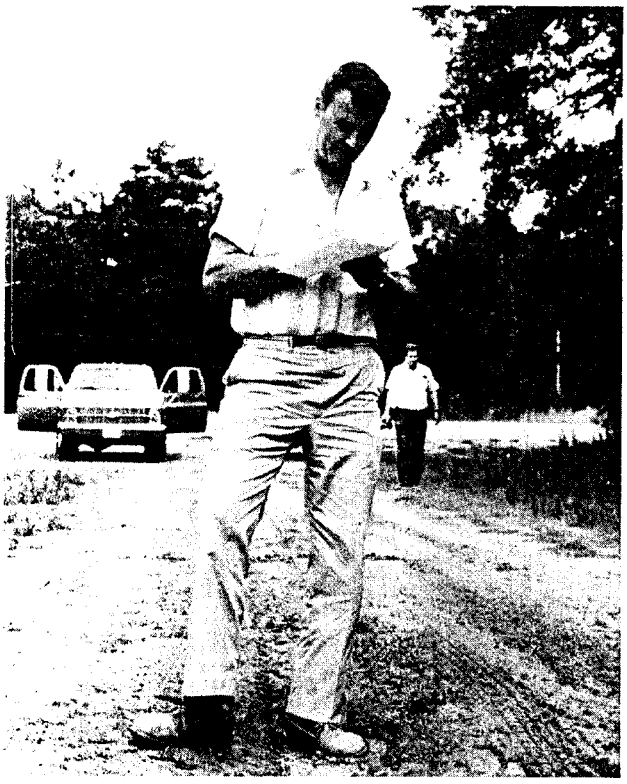
It is important to make a map showing the sizes and locations of the sample units so you can find them again. Also, mark the field sites with permanent markers.

STEP TWO: INSPECTING UNSURFACED ROADS

There are two kinds of inspections. The first is a quick survey done from a moving vehicle. The second involves detailed measurements of distresses in the sample units.

To do the "windshield inspection," drive the full length of the road at 25 mph. (The speed may be higher or lower depending on road conditions or local practice.) Note any surface or drainage problems along the road. If your area has times of the year when unsurfaced roads need regular maintenance to keep them usable, such as the spring "mud season" in New England, keep track of where the maintenance was done so that you can inspect those areas during the windshield survey. These inspections

Careful measurements ...



...and good records will help you come up with an accurate rating.

should be made four times a year—once each season. You can use the results for estimating maintenance needs and priorities.

The detailed measurements necessary to compute the ratings are required at least once every three years. You should always make these measurements at the same time of year—when your roads are in their best and most consistent condition. In New England this would be between 15 August and 15 September.

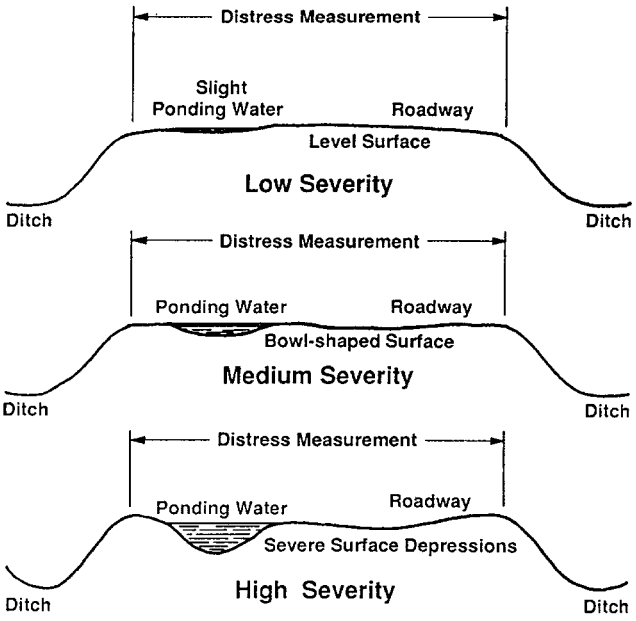
To make the measurements, you will need to be able to recognize certain kinds of problems, which we call ***distresses***. The sections that follow describe how to identify and measure the seven distress types for unsurfaced roads. The types are

1. Improper cross section
2. Inadequate roadside drainage
3. Corrugations
4. Dust
5. Potholes
6. Ruts
7. Loose aggregate.

If two or more distresses occur together, measure each one separately. If you have trouble telling which distress you're looking at, make a reasonable guess—the system is flexible enough to give you an accurate rating anyway.

Record the measurements on the middle part of the Unsurfaced Road Inspection Sheet. (A blank copy is in the back of this manual so that you can make copies for your use.) Make sure to fill in the identifying information at the top of the inspection sheet, and make a sketch of the sample unit. You should also make notes about anything unusual at the site—for example, if two distresses occur together, such as ruts and potholes.

IMPROPER CROSS SECTION



Improper cross section, high severity.

1. Improper Cross Section

Description: An unsurfaced road should have a crown with enough slope from the centerline to the shoulder to drain all water from the road's surface. No crown is used on curves, because they are usually banked. The cross section is improper when the road surface is not shaped or maintained to carry water to the ditches.

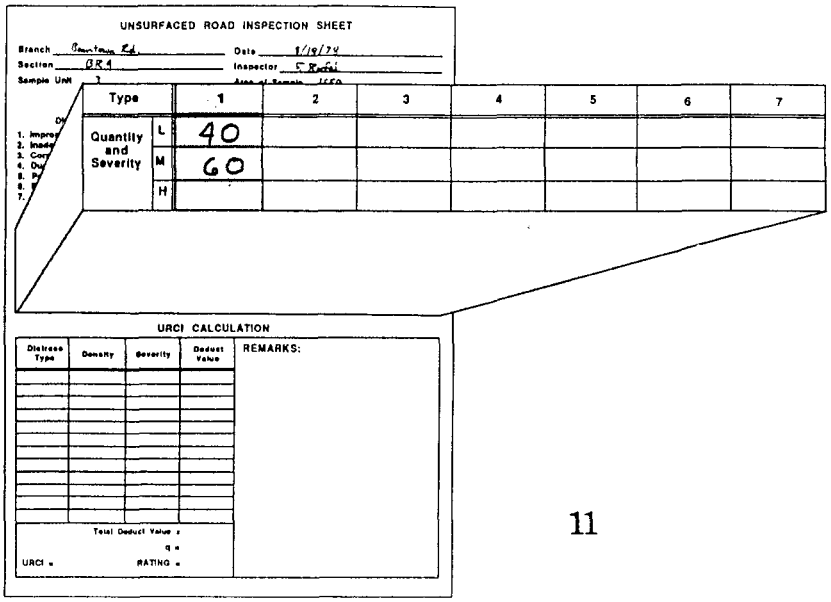
Severity Levels:

L:
- Small amounts of ponding water or evidence of ponding water on the road surface; or
- The road surface is completely flat (no cross-slope).

M:
- Moderate amounts of ponding water or evidence of ponding water on the road surface; or
- The road surface is bowl shaped.

H:
- Large amounts of ponding water or evidence of ponding water on the road surface; or
- The road surface contains severe depressions.

How to Measure: Improper cross section is measured in linear feet per sample unit (along the centerline or parallel to the centerline). The cross section runs from the outside shoulder break on one side of the road to the outside shoulder break on the other side. Different severity levels may exist within the sample unit. For example, there could be 60 feet with medium severity and 40 feet with low severity. The maximum length would be equal to the length of the sample unit.



UNSURFACED ROAD INSPECTION SHEET

Branch Mountain Rd. Date 1/19/74
Section GR1 Inspector C. Rafei
Sample Unit 1

Type		1	2	3	4	5	6	7
Quantity and Severity	L	40						
	M	60						
	H							

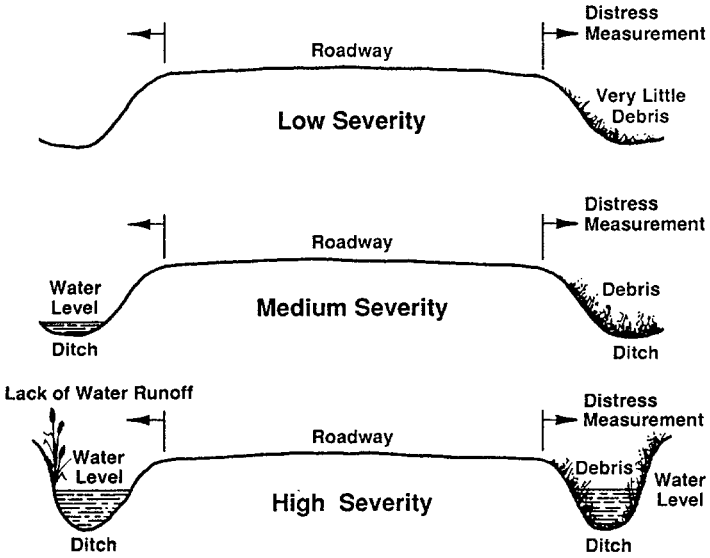
URCI CALCULATION

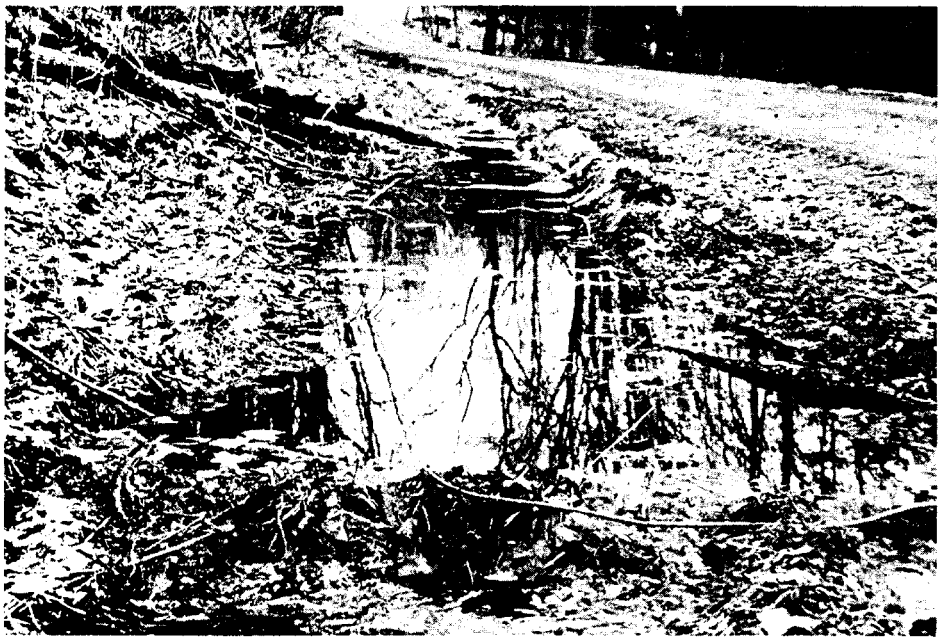
Distress Type	Density	Severity	Deduct Value

REMARKS:

Total Deduct Value =
q =
URCI = RATING =

INADEQUATE ROADSIDE DRAINAGE





Inadequate roadside drainage, high severity.

2. Inadequate Roadside Drainage

Description: Poor drainage causes water to pond. Drainage becomes a problem when ditches and culverts are not in good enough condition to direct and carry runoff water because of improper shape or maintenance.

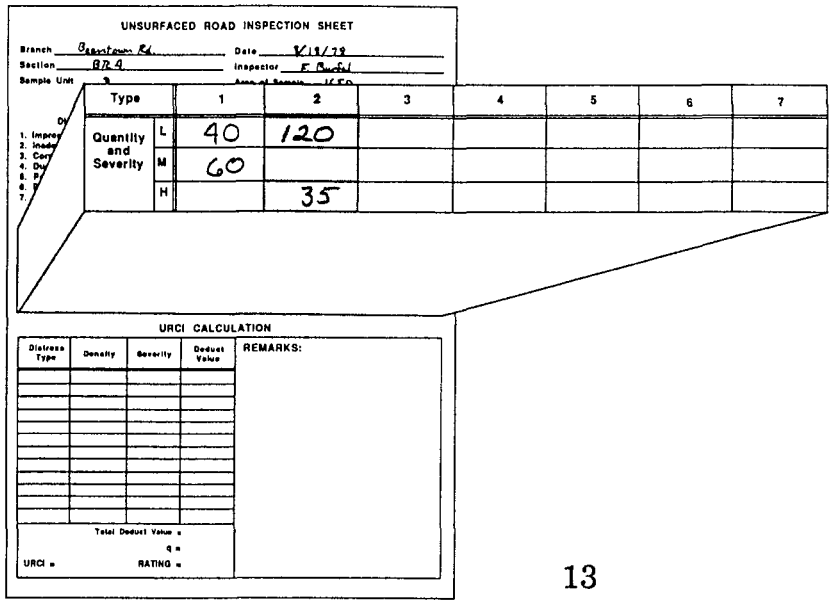
Severity Levels:

L: Small amounts of
- Ponding water or evidence of ponding water in the ditches; or
- Overgrowth or debris in the ditches.

M: Moderate amounts of
- Ponding water or evidence of ponding water in the ditches; or
- Overgrowth or debris in the ditches; or
- Erosion of the ditches into the shoulders or roadway.

H: Large amounts of
- Ponding water or evidence of ponding water in the ditches; or
- Water running across or down the road; or
- Overgrowth or debris in the ditches; or
- Erosion of the ditches into the shoulders or roadway.

How to Measure: Drainage problems are measured in linear feet per section parallel to the centerline. The maximum length is two times the length of the sample unit (two ditches for the total length of the sample unit). For example, a sample unit may have 120 feet with low severity and 35 feet with high severity.



UNSURFACED ROAD INSPECTION SHEET

Branch Beartown Rd. Date 7/13/78
Section BR 4 Inspector E. Burfal
Sample Unit 3

Type		1	2	3	4	5	6	7
Quantity and Severity	L	40	120					
	M	60						
	H		35					

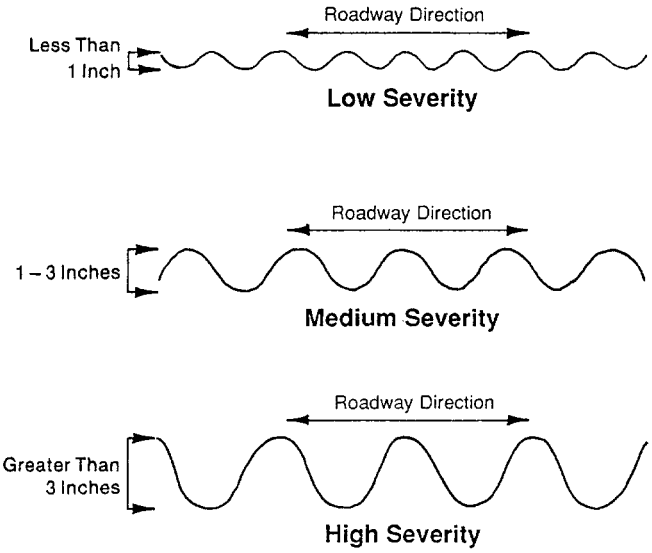
URCI CALCULATION

Distress Type	Density	Severity	Deduct Value

REMARKS:

Total Deduct Value =
q =
URCI = RATING =

CORRUGATIONS



Corrugations, medium severity.

3. Corrugations

Description: Corrugations (also known as washboarding) are closely spaced ridges and valleys (ripples) at fairly regular intervals. The ridges are perpendicular to the traffic direction. This type of distress is usually caused by traffic and loose aggregate. These ridges usually form on hills, on curves, in areas of acceleration or deceleration, or in areas where the road is soft or potholed.

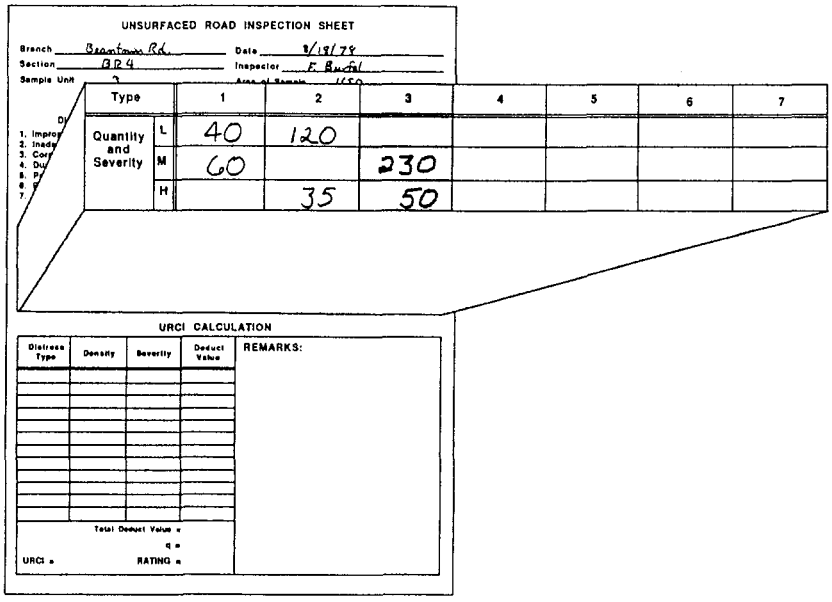
Severity Levels:

L: Corrugations are less than 1 inch deep.

M: Corrugations are between 1 and 3 inches deep.

H: Corrugations are deeper than 3 inches.

How to Measure: Corrugations are measured in square feet of surface area per sample unit. The amount cannot exceed the total area of the sample unit. For example, a sample unit may have 230 square feet with moderate severity and 50 square feet with high severity.



UNSURFACED ROAD INSPECTION SHEET

Branch Beantown Rd. Date 9/19/79

Section BR4 Inspector F. Burtal

Sample Unit 2 Area of Sample 1250

Type		1	2	3	4	5	6	7
Quantity and Severity	L	40	120					
	M	60		230				
	H		35	50				

URCI CALCULATION

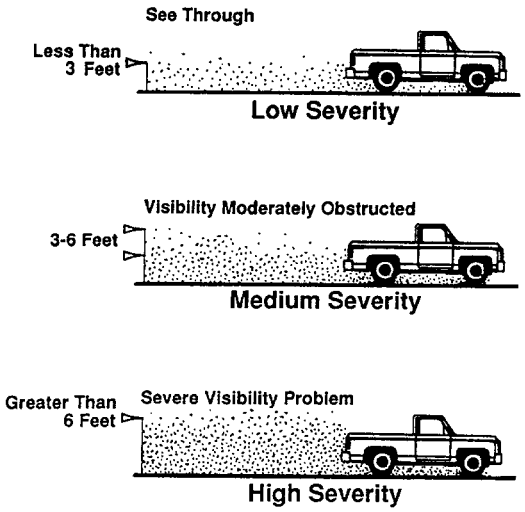
Distress Type	Density	Severity	Deduct Value	REMARKS:

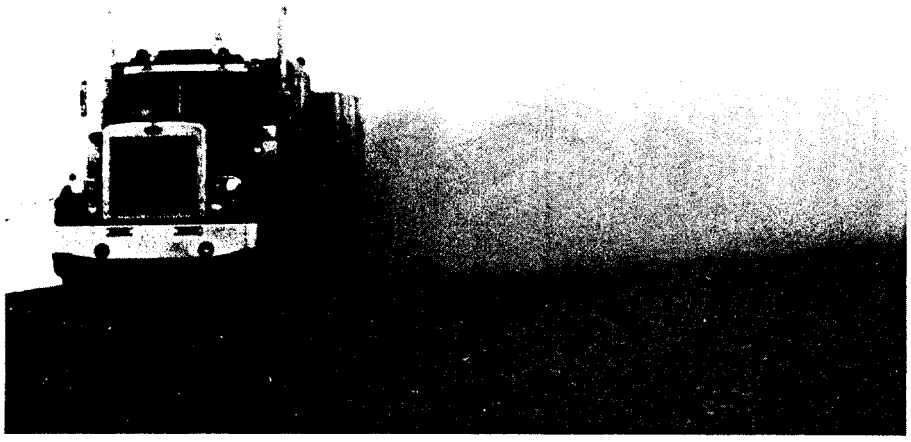
Total Deduct Value =

q =

URCI = RATING =

DUST





Dust, high severity.

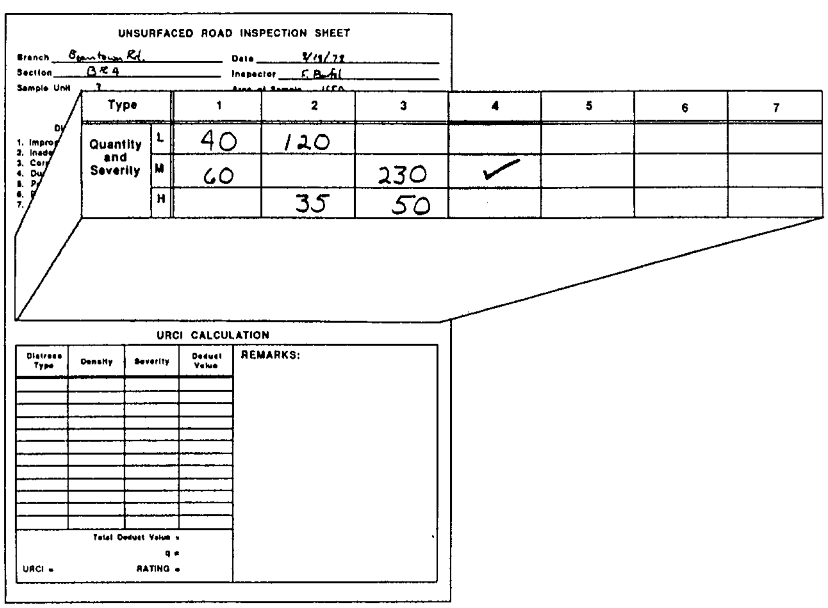
4. Dust

Description: The wear and tear of traffic on unsurfaced roads will eventually loosen the larger particles from the soil binder. As traffic passes, dust clouds create a danger to trailing or passing vehicles and cause significant environmental problems.

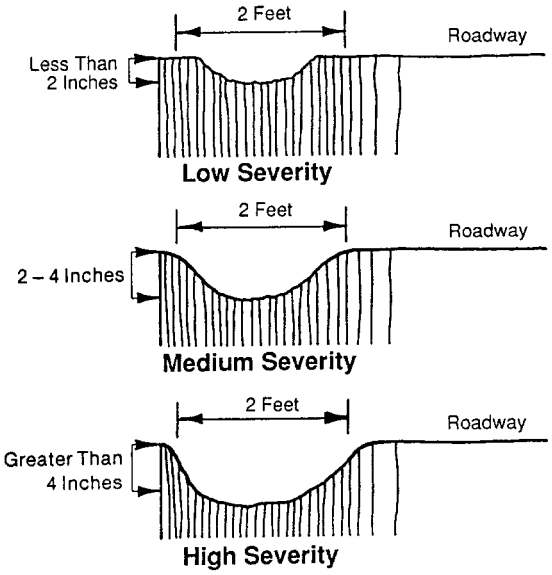
Severity Levels:

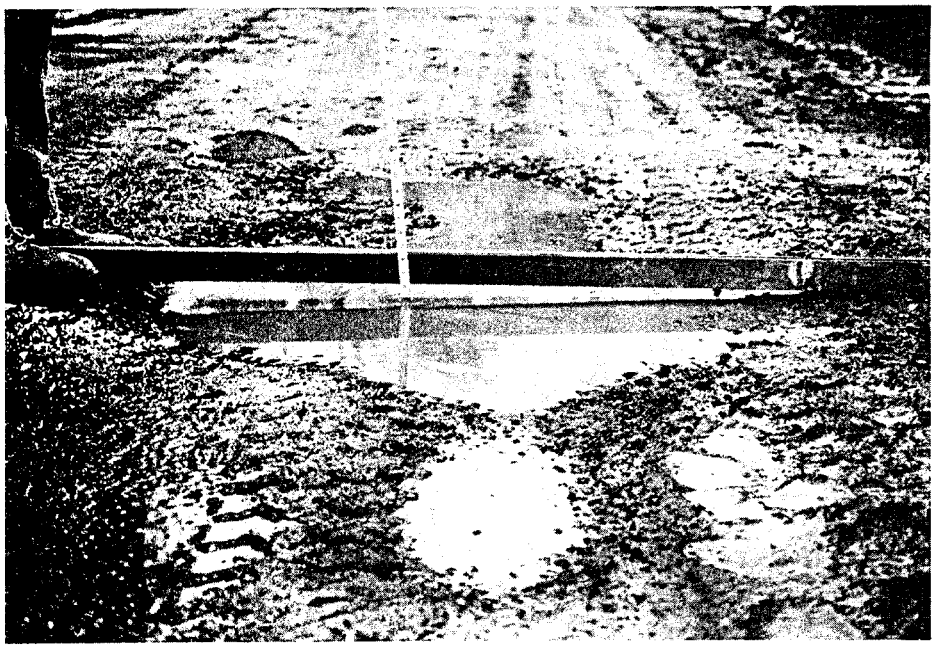
- **L:** Normal traffic produces a thin dust that does not obstruct visibility.
- **M:** Normal traffic produces a moderately thick cloud that partially obstructs visibility and causes traffic to slow down.
- **H:** Normal traffic produces a very thick cloud that severely obstructs visibility and causes traffic to slow down significantly or stop.

How to Measure: Drive a vehicle at 25 mph and watch the dust cloud. Dust is measured as low, medium or high severity for the sample unit.



POTHOLES





Pothole, high severity.

5. Potholes

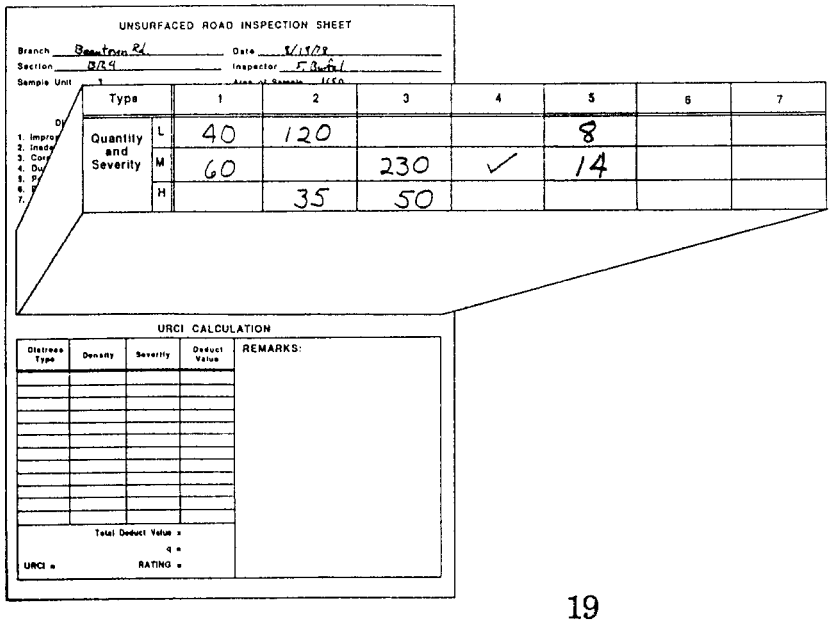
Description: Potholes are bowl-shaped depressions in the road surface. They are usually less than 3 feet in diameter. Potholes are produced when traffic wears away small pieces of the road surface. They grow faster when water collects inside the hole. The road then continues to disintegrate because of loosening surface material or weak spots in the underlying soils.

Severity Levels: The levels of severity for potholes are based on both the diameter and the depth of the pothole according to the following table:

	Average diameter			
	Less than			More than
Maximum depth	1 foot	1–2 feet	2–3 feet	3 feet*
1/2–2 inches	L	L	M	M
2–4 inches	L	M	H	H
4+ inches	M	H	H	H

* If the pothole is over 3 feet in diameter, the area should be determined in square feet and divided by 7 to find the equivalent number of potholes.

How to measure: Potholes are measured by counting the number that are low, medium and high severity in a sample unit and recording them separately by severity level. For example, there may be 14 potholes of medium severity and 8 potholes of low severity.



UNSURFACED ROAD INSPECTION SHEET

Branch Beaufort Rd. Date 1/15/98

Section B24 Inspector S Bethel

Sample Unit 1 Area of Sample 1250

Type		1	2	3	4	5	6	7
Quantity and Severity	L	40	120			8		
	M	60		230	✓	14		
	H		35	50				

URCI CALCULATION

Distress Type	Density	Severity	Deduct Value

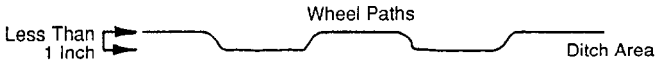
REMARKS:

Total Deduct Value =

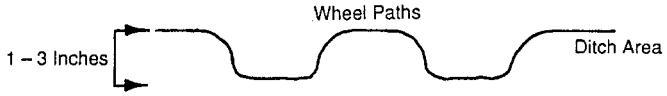
q =

URCI = RATING =

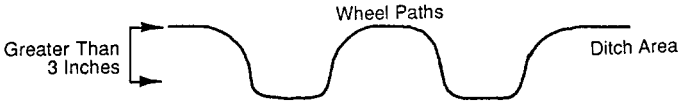
RUTS



Low Severity



Medium Severity



High Severity

Ruts, low severity.

6. Ruts

Description: A rut is a surface depression in the wheel path that is parallel to the road centerline. Ruts are caused by a permanent deformation in any of the road layers or subgrade. They result from repeated vehicle passes, especially when the road is soft. Significant rutting can destroy a road.

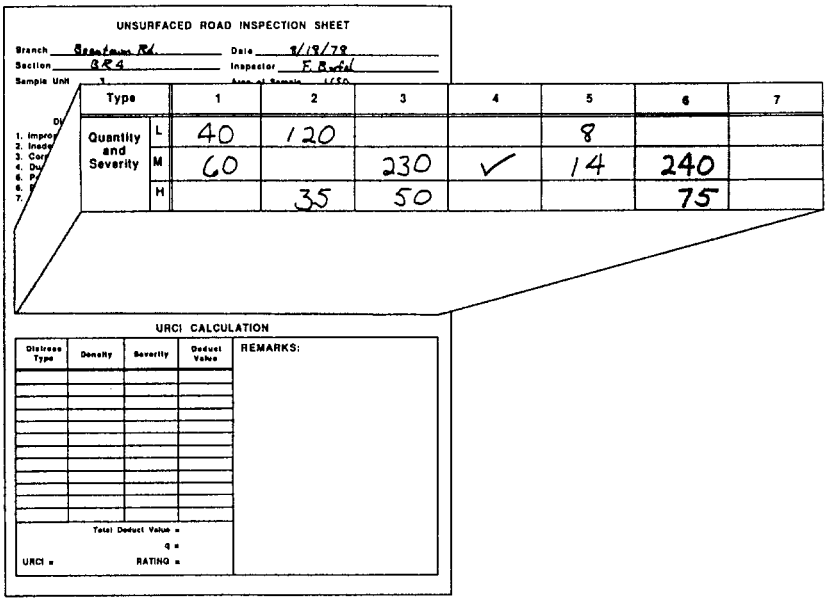
Severity Levels:

L: Ruts are less than 1 inch deep.

M: Ruts are between 1 and 3 inches deep.

H: Ruts are deeper than 3 inches.

How to Measure: Ruts are measured in square feet of surface area per sample unit. For example, a sample unit may have 75 square feet with high severity and 240 square feet with medium severity.



UNSURFACED ROAD INSPECTION SHEET

Branch Beantown Rd. Date 9/19/79

Section GR4 Inspector F. Burtal

Sample Unit 1 Area of Sample 1250

Type		1	2	3	4	5	6	7
Quantity and Severity	L	40	120			8		
	M	60		230	✓	14	240	
	H		35	50			75	

URCI CALCULATION

Distress Type	Density	Severity	Deduct Value

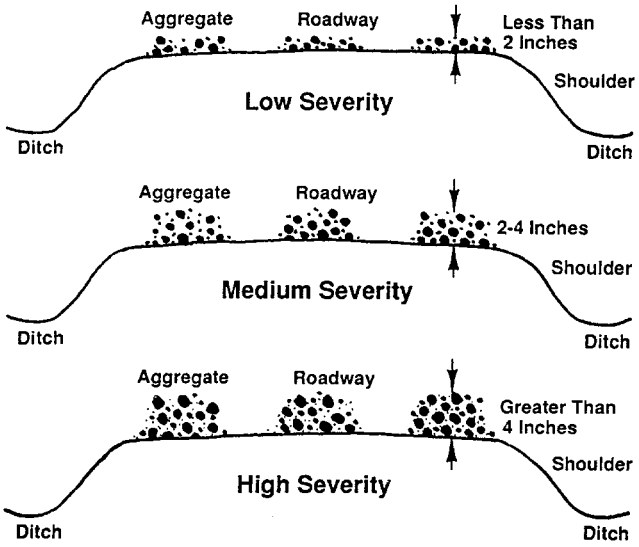
REMARKS:

Total Deduct Value =

q =

URCI = RATING =

LOOSE AGGREGATE



Loose aggregate, low severity.

7. Loose Aggregate

Description: The wear and tear of traffic on unsurfaced roads will eventually loosen the larger aggregate particles from the soil binder. This leads to loose aggregate particles on the road surface or shoulder. Traffic moves loose aggregate particles away from the normal road wheel path and forms berms in the center or along the shoulder (the less-traveled areas).

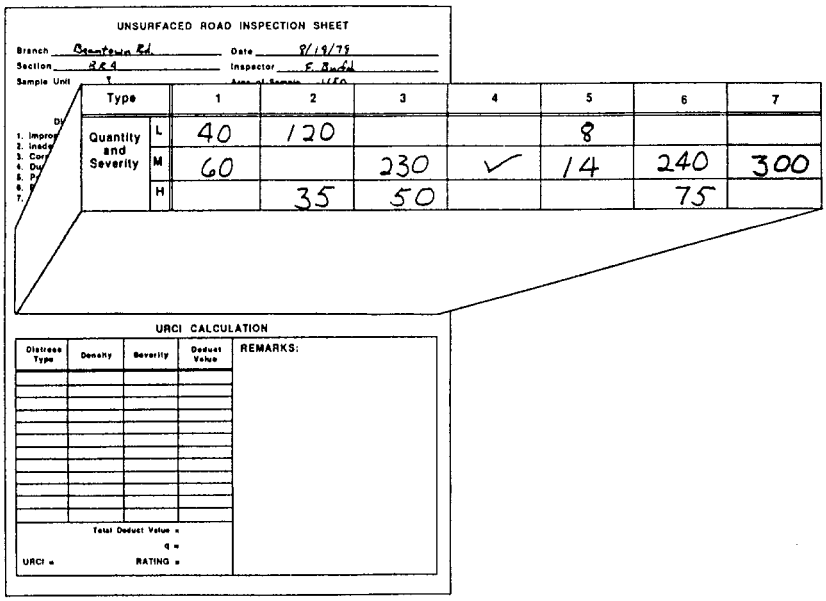
Severity Levels:

L: Loose aggregate on the road surface, or a berm of aggregate (less than 2 inches deep) on the shoulder or less-traveled area.

M: Moderate aggregate berm (between 2 and 4 inches deep) on the shoulder or less-traveled area. A large amount of fine soil particles is usually found on the roadway surface.

H: Large aggregate berm (greater than 4 inches deep) on the shoulder or less-traveled area.

How to Measure: Loose aggregate is measured in linear feet parallel to the centerline in a sample unit. Each berm is measured separately. For example, if a sample unit that is 100 feet long has three berms of medium-severity loose aggregate—one on each side and one down the middle—then the measurement would be 300 feet at medium severity.



UNSURFACED ROAD INSPECTION SHEET

Branch Countown Rd. Date 9/19/75

Section RR 4 Inspector E. Smith

Sample Unit 1 Area of Sample 1760

Type		1	2	3	4	5	6	7
Quantity and Severity	L	40	120			8		
	M	60		230	✓	14	240	300
	H		35	50			75	

1. Improved
2. Inadequate
3. Corrugations
4. Dust
5. Potholes
6. Loose Aggregate
7.

URCI CALCULATION

Distress Type	Density	Severity	Deduct Value	REMARKS:

Total Deduct Value =

q =

URCI = RATING =

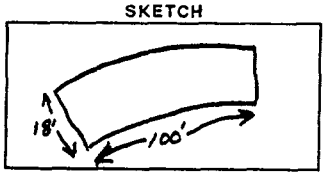
UNSURFACED ROAD INSPECTION SHEET

Branch Beantown Rd. Date 9/12/86
Section BR6 Inspector F. Budd
Sample Unit 2 Area of Sample 1800 sq.ft.

DISTRESS TYPES

1. Improper Cross Section (linear feet)
2. Inadequate Roadside Drainage (linear feet)
3. Corrugations (square feet)
4. Dust
5. Potholes (number)
6. Ruts (square feet)
7. Loose Aggregate (linear feet)

SKETCH



DISTRESS QUANTITY AND SEVERITY

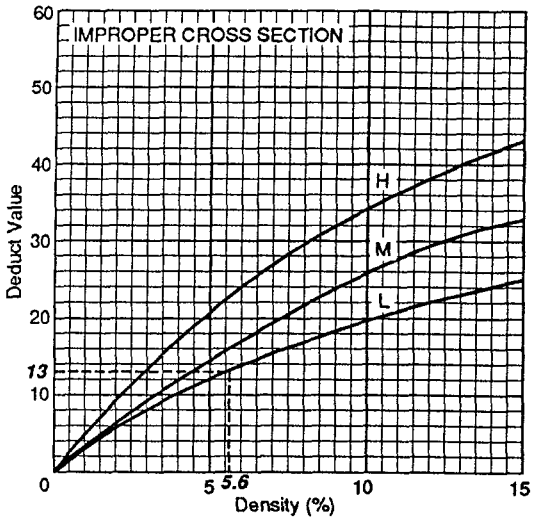
Type		1	2	3	4	5	6	7
Quantity and Severity	L	100						
	M			900	✓			140
	H							

URCI CALCULATION

Distress Type	Density	Severity	Deduct Value
1	5.6	L	13
3	50.0	M	29
4		M	5
7	7.8	M	17

Total Deduct Value = 64
q = 4
URCI = 59 RATING = GOOD

REMARKS:



Here's how to find the deduct value from the curves in the back of this manual.

STEP THREE: CALCULATING THE RATINGS

The distress measurements are used to calculate the Unsurfaced Road Condition Index (URCI), based on deduct values. A ***deduct value*** is a number from 0 to 100, with 0 meaning that the distress has no impact on the road condition and 100 meaning that the road has completely failed.

We will show how to do this calculation by running through an example. A summary is in the back of the manual for when you need a quick review. There are also other examples in the back.

Step 1. Calculate the density for each distress type (except dust):

$$\text{Density} = \frac{\text{Amount of Distress}}{\text{Area of Sample Unit}} \times 100\ \%.$$

In this example the density of each distress and severity level is based on a sample unit of 1800 square feet .

- For 100 linear feet of improper cross section (distress type 1), the density is

$$\frac{100}{1800} \times 100 = 5.6.$$

- For 900 square feet of corrugations (distress type 3), the density is

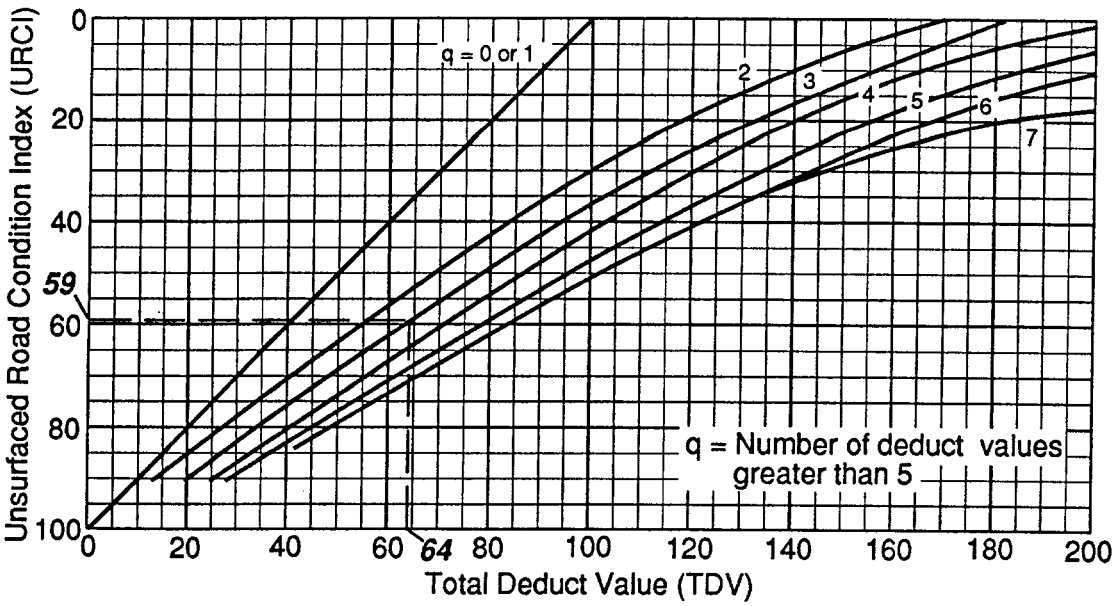
$$\frac{900}{1800} \times 100 = 50.0.$$

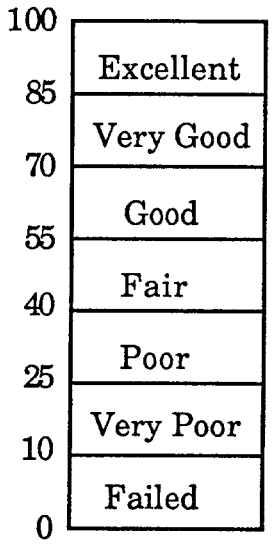
- No density calculation is needed for dust (distress type 4).
- For 140 linear feet of loose aggregate (distress type 7), the density is

$$\frac{140}{1800} \times 100 = 7.8.$$

Step 2. Using the deduct value curves, find the deduct values for each distress type and severity level. The deduct value curves are in the back of this manual.

- For improper cross section at low severity, the deduct value is about 13, as shown in the curve to the left.
- For corrugations at medium severity, the deduct value is 29.


Unsurfaced Road Condition Index (URCI)
0
20
40
59
60
80
100
0
20
40
60
64
80
100
120
140
160
180
200
Total Deduct Value (TDV)
q = 0 or 1
2
3
4
5
6
7
q = Number of deduct values greater than 5


100
85
70
55
40
25
10
0
Excellent
Very Good
Good
Fair
Poor
Very Poor
Failed

URCI Scale

- For dust at medium severity, the deduct value is 5. This value comes from a table.
- For loose aggregate at medium severity, the deduct value is 17.

Step 3. Find the Total Deduct Value (TDV) and the *q* value. Calculate the TDV by adding up all the deduct values. The *q* value is the number of individual deduct values greater than 5.0.

- TDV = 13 + 29 + 5 + 17 = 64.
- The *q* value is 3 because 3 deduct values are greater than 5.0.

Step 4. Find the Unsurfaced Road Condition Index (URCI) from the URCI curve.

- The TDV is 64 and *q* is 3, so the URCI curve shows that the URCI is 59. The rating is "good."
- This is the rating for this sample unit. The rating for the section is the average of the ratings from all the sample units in the section. For example, URCIs of 63, 59 and 67 in a section would give an average URCI of 63 for the whole section.

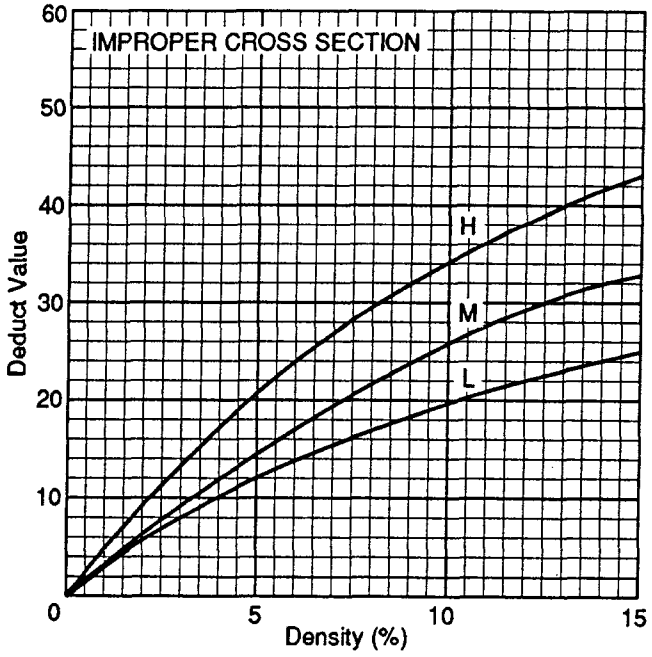
CONCLUSION

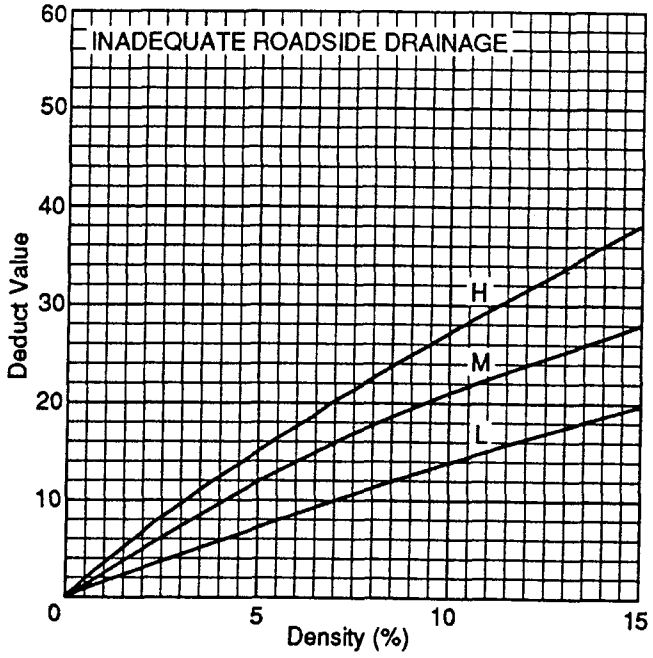
Now that you have calculated the URCI, what can you do with it?

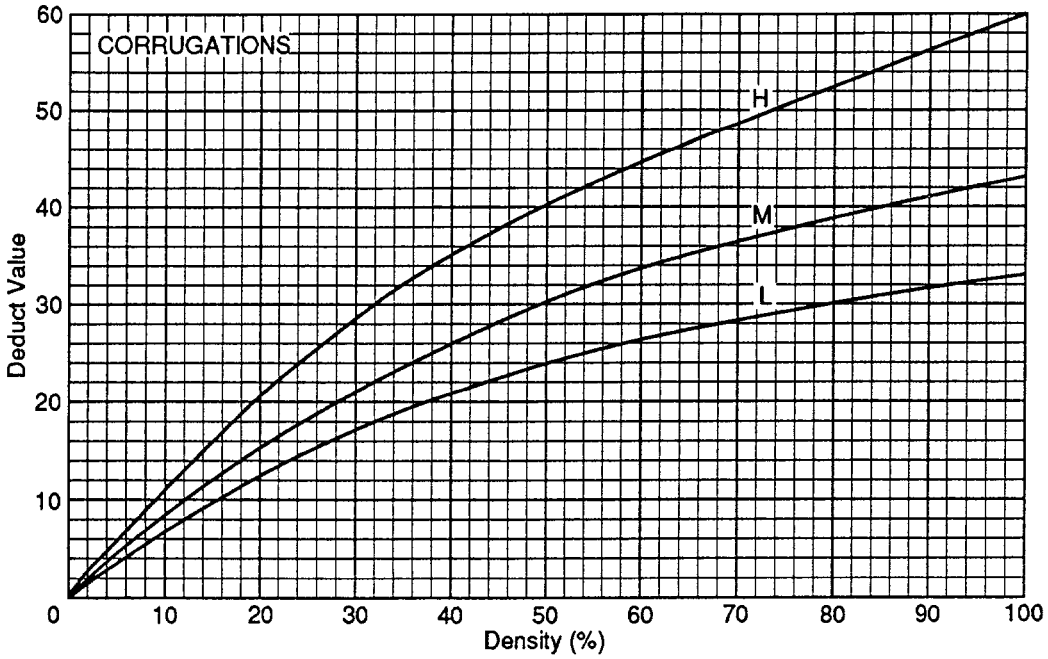
The most important thing you can do is use it to compare the condition of sections in your road network. You can use the URCI, along with information on traffic volume, improvement costs, etc., to help you decide where to spend your maintenance budget.

You can also compute an average for your road network. By comparing the average from year to year, you can tell if your road network is improving or deteriorating.

DEDUCT VALUE CURVES



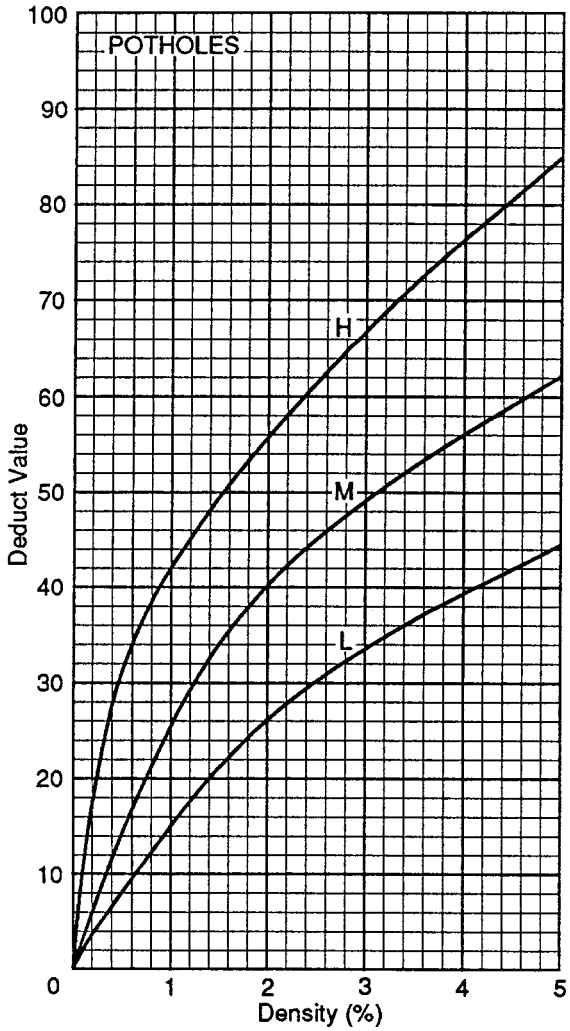


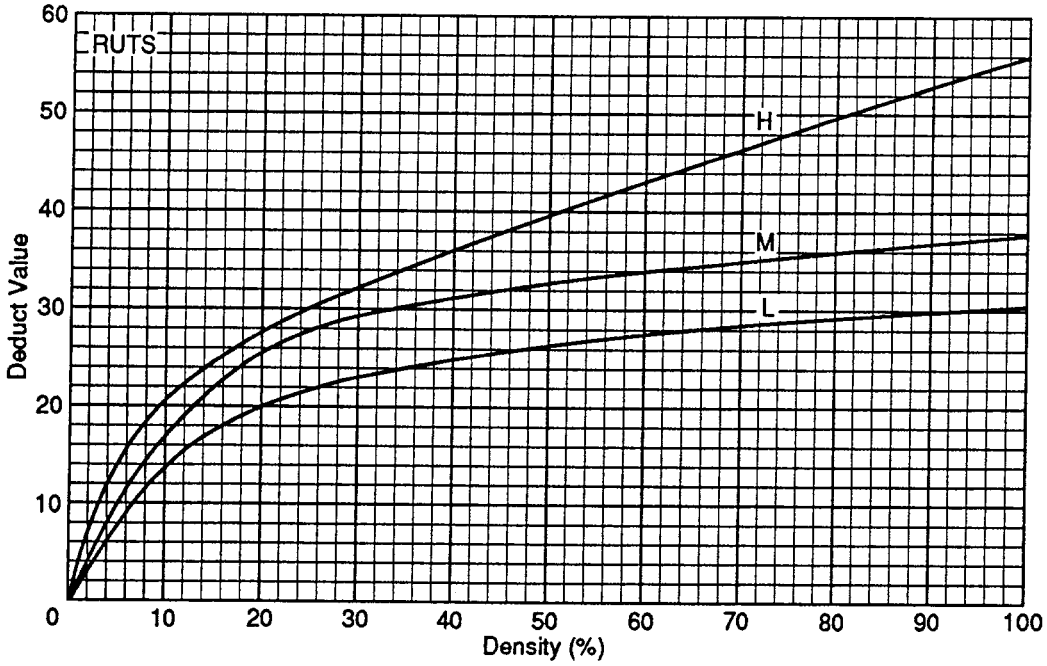


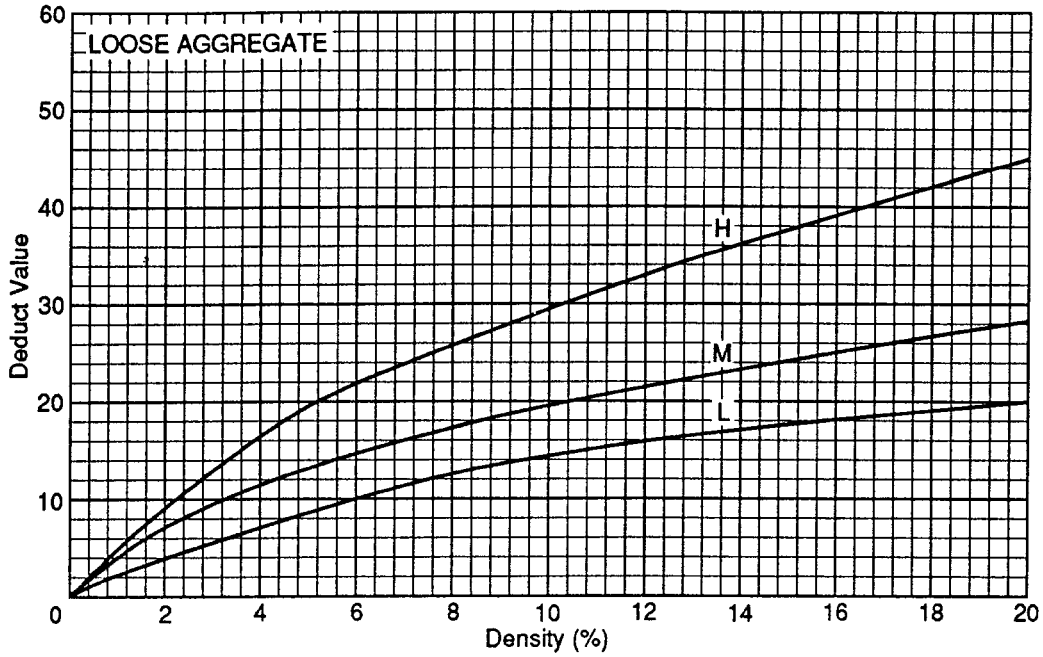
DUST

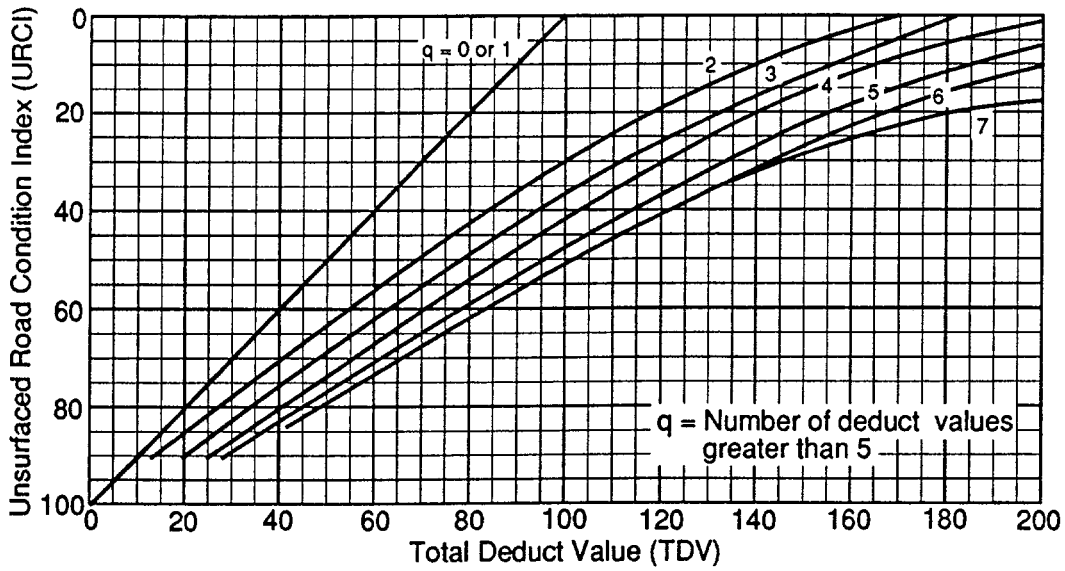
Dust is not rated by density. The deduct values for the levels of severity are:

LOW	2 points
MEDIUM	5 points
HIGH	15 points


POTHOLES
Deduct Value
Density (%)
H
M
L
0
10
20
30
40
50
60
70
80
90
100
1
2
3
4
5


RUTS
Deduct Value
Density (%)
H
M
L
0
10
20
30
40
50
60
70
80
90
100


LOOSE AGGREGATE
Deduct Value
Density (%)
H
M
L
0
10
20
30
40
50
60
2
4
6
8
10
12
14
16
18
20


Unsurfaced Road Condition Index (URCI)
Total Deduct Value (TDV)
q = 0 or 1
2
3
4
5
6
7
q = Number of deduct values greater than 5
0
20
40
60
80
100
120
140
160
180
200

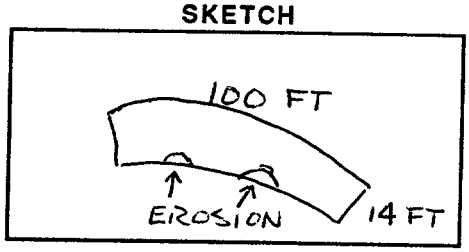
UNSURFACED ROAD INSPECTION SHEET

Branch FS 144A — Date JULY 18, 1986
Section 1 — Inspector R. PERRY
Sample Unit 1 — Area of Sample 1400 SQFT

DISTRESS TYPES

1. Improper Cross Section (linear feet)
2. Inadequate Roadside Drainage (linear feet)
3. Corrugations (square feet)
4. Dust
5. Potholes (number)
6. Ruts (square feet)
7. Loose Aggregate (linear feet)

SKETCH



DISTRESS QUANTITY AND SEVERITY

Type		1	2	3	4	5	6	7
Quantity and Severity	L				X			
	M	100					490	
	H		200				910	

URCI CALCULATION

Distress Type	Density	Severity	Deduct Value
1	7.1	M	19
2	14.3	H	36
4		L	2
6	35.0	M	31
6	65.0	H	44

Total Deduct Value = 132
q = 4
URCI = 25 RATING = POOR

REMARKS:

EROSION INTO ROAD;
STANDING WATER IN SEVERAL PLACES

UNSURFACED ROAD INSPECTION SHEET

Branch Turkey Farm Rd. Date Sept. 4 1987

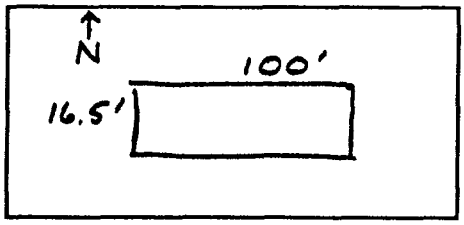
Section TFR2 Inspector Ray Rogers

Sample Unit 3 Area of Sample 1650

DISTRESS TYPES

1. Improper Cross Section (linear feet)
2. Inadequate Roadside Drainage (linear feet)
3. Corrugations (square feet)
4. Dust
5. Potholes (number)
6. Ruts (square feet)
7. Loose Aggregate (linear feet)

SKETCH



DISTRESS QUANTITY AND SEVERITY

Type		1	2	3	4	5	6	7
Quantity and Severity	L			36		28	180	
	M	30		18		8		
	H							

URCI CALCULATION

Distress Type	Density	Severity	Deduct Value
1	1.8	M	6
3	2.2	L	2
3	1.1	M	2
5	1.6	L	23
5	0.48	M	16
6	14.5	L	18

Total Deduct Value = 67

q = 4

URCI = 62 RATING = good

REMARKS:

All problems occur together starting about 20' from west end of sample unit.

UNSURFACED ROAD INSPECTION SHEET

Branch _____ Date _____

Section _____ Inspector _____

Sample Unit _____ Area of Sample _____

DISTRESS TYPES

1. Improper Cross Section (linear feet)
2. Inadequate Roadside Drainage (linear feet)
3. Corrugations (square feet)
4. Dust
5. Potholes (number)
6. Ruts (square feet)
7. Loose Aggregate (linear feet)

SKETCH

DISTRESS QUANTITY AND SEVERITY

Type		1	2	3	4	5	6	7
Quantity and Severity	L							
	M							
	H							

URCI CALCULATION

Distress Type	Density	Severity	Deduct Value

Total Deduct Value =

q =

URCI = RATING =

REMARKS:

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Calculating the Unsurfaced Road Condition Index (URCI)

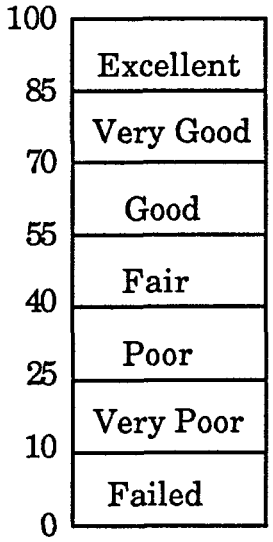
Step 1. Calculate the density for each distress type (except dust):

$$\text{Density} = \frac{\text{Amount of Distress}}{\text{Area of Sample Unit}} \times 100\ \%.$$

Step 2. Use the deduct value curves to find the deduct value for each distress type and severity level. (The values for dust come from a table.)

Step 3. Find the Total Deduct Value (TDV) and the *q* value. Calculate the TDV by adding up all the deduct values. The *q* value is the number of individual deduct values greater than 5.0.

Step 4. Use the TDV and *q* values to determine the Unsurfaced Road Condition Index (URCI) from the URCI curve. This is the rating for the sample unit. The rating for a section is the average of the URCIs for all the sample units in the section.



URCI Scale