A Pavement Rating System for Low-Volume Asphalt Roads

**ASPHALT PAVEMENT RATING FORM**

<table>
<thead>
<tr>
<th>STREET OR ROUTE</th>
<th>CITY OR COUNTY</th>
<th>LENGTH OF PROJECT</th>
<th>WIDTH</th>
<th>DATE</th>
</tr>
</thead>
</table>

**PAVEMENT TYPE**

(Note: A rating of "0" indicates defect does not occur)

<table>
<thead>
<tr>
<th>DEFECTS</th>
<th>RATING</th>
</tr>
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<tbody>
<tr>
<td>Transverse Cracks</td>
<td>0-5</td>
</tr>
<tr>
<td>Longitudinal Cracks</td>
<td>0-10</td>
</tr>
<tr>
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</tr>
<tr>
<td>Raveling</td>
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</tr>
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</tr>
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<td>0-10</td>
</tr>
<tr>
<td>Polished Aggregate</td>
<td>0-10</td>
</tr>
<tr>
<td>Deficient Drainage</td>
<td>0-10</td>
</tr>
<tr>
<td>Overall Riding Quality</td>
<td>0-10</td>
</tr>
</tbody>
</table>

10 is very poor; 0 is excellent; Sum of Defects

**Condition Rating**

\[
\text{Condition Rating} = 100 - \text{Sum of Defects} \\
= 100 - \_
\]

Condition Rating 2

**ASPHALT INSTITUTE**

Information Series No. 169 (IS-169)
A PAVEMENT RATING SYSTEM
FOR LOW-VOLUME ASPHALT ROADS

INTRODUCTION

For those individuals or agencies with the responsibility of maintaining low-volume roads and streets, deciding which roads should get first attention is often difficult. One factor complicating the decision is the variety of types of pavement distress — some serious, others rather insignificant. This publication presents a system that utilizes the experience of an engineer, maintenance superintendent, or foreman to assign a numerical value to each type of pavement defect, taking into account both the extent of distress and its relative seriousness. The sum of these numerical values provides a fairly accurate, though subjective, index of the general condition of the road. The index can be useful in setting maintenance priorities.

Part 1 of this publication explains the pavement condition rating system. Part 2 contains photographs and descriptions of the different types of distress.

PART 1
WHERE THE SYSTEM APPLIES

The rating system is intended for agencies or organizations not having the benefit of specialized highway engineering experience and without access to conventional testing facilities. It is designed to apply to relatively low-volume roads and streets — those that carry fewer than 1,000 cars and 50 trucks per day.

MAKING THE INSPECTION

An effective way of inspecting a pavement is first to drive slowly over the road to get an overall impression of its condition. Then, to make a thorough inspection on foot, making rough notes on the type and extent of distress as one goes along. When the inspection is completed, the rating form is filled out. It may be useful to drive again slowly over the pavement after filling out the rating form. Since the system is based on personal judgment, better results are obtained when two or more experienced individuals independently rate the pavements and the results are averaged.

RATING A ROAD

As mentioned earlier, some defects affect the performance of a pavement more than others. Under this rating system, the less serious problems are assigned values between 0 and 5. Defects of a more serious nature — those directly related to the strength of the pavement — are rated on a scale of 0 to 10. A rating of 0 means that the pavement is free of that particular type of distress. Part 2 of this publication should be helpful in identifying the different types of defects.

When assigning a rating to a particular type of defect, it is important to consider both its extent and severity. For example, a rating of 10 for “rutting” would indicate that it occurs on much or all of the road, and that the ruts are probably deep enough to be a safety hazard, especially during rain, and an impediment to traffic at all times. On the other hand, a rating of 1 for “corrugations” would indicate that corrugations, although evident, are not numerous and that at present the distortions are not very large.

After each defect is rated, the individual ratings are added. This sum is then subtracted from 100, and the result is simply called the “condition rating.”

The procedures contained herein are considered reliable. However The Asphalt Institute can accept no responsibility for inappropriate use of this rating system.
## ASPHALT PAVEMENT RATING FORM

**STREET OR ROUTE** __________________________ **CITY OR COUNTY** __________________________

**LENGTH OF PROJECT** __________________________ **WIDTH** __________________________

**PAVEMENT TYPE** __________________________ **DATE** __________________________

(Note: A rating of “0” indicates defect does not occur)

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**Overall Riding Quality (0 is excellent; 10 is very poor):** 0-10

**Sum of Defects** __________________________

**Condition Rating** = 100 - **Sum of Defects**

= 100 - ______

**Condition Rating** = [ ]

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Figure 1. Asphalt pavement rating form.
INTERPRETING THE CONDITION RATING

There are two ways that the condition rating can be used. First, as a relative measurement, it provides a rational method for ranking roads and streets according to their condition.

Secondly, as an absolute measure, the condition rating provides a general indicator of the type and degree of repair work necessary. As a very general rule, if the condition rating is between 80 and 100, normal maintenance operations such as crack-filling, pot hole repair, or perhaps a seal coat are usually all that is required. If the condition rating falls below 80, it is likely that an overlay will be necessary. In this event, it may be advisable to contact the nearest Asphalt Institute or other similarly qualified engineer for assistance. If the condition rating is below 30, chances are that major reconstruction is necessary; this is illustrated in Figure 2.

![Condition Rating Graph]

CONDITION RATING AS A GENERAL INDICATOR OF TYPE OF MAINTENANCE

Figure 2.

PART 2
PAVEMENT DEFECTS

CAUSES OF PAVEMENT DEFECTS

Although a detailed discussion of the subject is beyond the scope of this publication, an understanding of the cause of a pavement defect is essential before an attempt is made to remedy it. Similarly, efficient use of a maintenance budget requires that proven methods be used to prevent recurrence of a problem. Accompanying the illustrations of defects that follow, there is a brief statement of their usual cause and the suggested means of repair. If more detailed assistance is needed in determining either the cause of a defect or the proper method of its repair, it may be advisable to contact the nearest Asphalt Institute office listed on the back cover. Other Asphalt Institute publications that might be particularly useful are: Full-Depth Asphalt Patching, CL-19; Asphalt in Pavement Maintenance, MS-16; Asphalt Overlays for Highway and Street Rehabilitation, MS-17; and Drainage of Asphalt Pavement Structures, MS-15.
TRANSVERSE CRACK — A crack that follows a course approximately at right angles to the pavement centerline.
This frequently is caused by movement in the pavement beneath the asphalt layer (reflection cracking). Can also result from stresses induced by low-temperature contraction of the pavement.
Requires filling with asphalt emulsion slurry. This is usually (but not necessarily) followed by a seal coat or overlay over the entire surface.

LONGITUDINAL CRACK — A crack that follows a course approximately parallel to the centerline.
This usually results from a weak joint between paving lanes. These cracks can also result from earth movements, particularly on embankments. Two closely-spaced longitudinal cracks in a wheel path usually indicate bending stress induced by rutting. Longitudinal cracks can also occur as a result of movement in the pavement beneath the asphalt layer (reflection cracking).
For repair, see “Transverse Crack.”

ALLIGATOR CRACKS — Interconnected cracks forming a series of small polygons, the pattern resembling an alligator’s skin.
Caused by excessive deflection of the surface over unstable subgrade or lower courses of the pavement. The unstable support usually is the result of saturated granular bases or subgrade.
Requires deep patching.
Rutting — Longitudinal depressions that form under traffic in the wheel paths and have a minimum length of approximately 6 m (20 ft). Caused by consolidation or lateral movement under traffic in one or more of the underlying courses, or by displacement in the asphalt surface layer itself. Rutts should be filled with hot plant-mixed material to restore proper cross section. This should be followed by a thin overlay.

Shrinkage Cracks — Interconnected cracks forming a series of large polygons, usually having sharp angles at the corners. Caused by volume change in the asphalt mix or in the base or subgrade. Requires crack filling with asphalt emulsion slurry followed by a surface treatment or a slurry seal over the entire surface.

Corrugations — Transverse undulations at regular intervals in the surface of the pavement consisting of alternate closely-spaced valleys and crests. Caused by lack of stability in asphalt layers. Requires repair before resurfacing. If the corrugated pavement has an aggregate base with a thin surface treatment, a satisfactory corrective measure is to scarify the surface, mix it with the base, and recompact the mixture before resurfacing. If the pavement has more than 5 cm (2 in.) of asphalt surfacing and base, shallow corrugations can be removed with a pavement planing machine. This is followed with a seal coat or overlay.

Raveling — The progressive disintegration from the surface downward, or edges inward by the dislodgement of aggregate particles. Caused by lack of compaction during construction, construction during wet or cold weather, dirty or disintegrating aggregate, too little asphalt in the mix, or overheating of the asphalt mix. Usually requires a seal coat.
SHOVELING — Lateral displacement of paving material due to the action of traffic, generally resulting in the bulging of the surface. Caused by lack of stability in asphalt layers. Requires removal of affected area, followed by deep patching.

POT HOLES — Bowl-shaped holes of varying sizes in the pavement, often the result of progressive deterioration of other defects such as alligator cracking. Usually caused by a combination of weaknesses in the pavement resulting from such as too little asphalt, too thin an asphalt surface, too many fines, too few fines, or poor drainage, and traffic. Requires deep patching.

POLISHED AGGREGATE — Aggregates in the surface of a pavement that have been polished smooth. Caused by naturally smooth uncrushed gravels and crushed rock that wears down quickly under action of traffic. Requires covering the surface with a skid resistant treatment.

EXCESS ASPHALT (BEEDING) — Free asphalt on the surface of the pavement. Caused by too much asphalt in one or more of the pavement courses. In many cases, bleeding can be corrected by repeated applications of hot sand, hot slag screenings or hot rock screenings to blot up the excess asphalt. Sometimes, when bleeding is light, a plant-mixed surface treatment or an aggregate seal coat, using absorptive aggregate, is the only treatment needed. In rare instances of heavily over-asphalted surfaces, the surfaces should be completely removed.

DEFICIENT DRAINAGE — Drainage problems may be considered in two categories: surface and subsurface. Proper surface drainage efficiently removes runoff from the pavement and the nearby ground. Standing water on the pavement or in the side ditches indicates surface drainage deficiency. Proper subsurface drainage keeps groundwater away from the pavement structure. Two indicators of deficient subsurface drainage are, in the absence of precipitation, water in a side ditch, or alligator cracking with moisture in the cracks.

For information on alleviation of drainage problems, the reader is referred to Drainage of Asphalt Pavement Structures, MS-15, The Asphalt Institute.
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