PAVEMENT CONDITION RATING PROCEDURES

INTRODUCTION

The rating method is based upon visual inspection of pavement distress. Although the relationship between pavement distress and performance is not well defined, there is general agreement that the ability of a pavement to sustain traffic loads in a safe and smooth manner is adversely affected by the occurrence of observable distress. The rating method provides a procedure for uniformly identifying and describing, in terms of severity and extent, pavement distress. The mathematical expression for pavement condition rating (PCR) provides an index reflecting the composite effects of varying distress types, severity, and extent upon the overall condition of the pavement.

The model for computing PCR is based upon the summation of deduct points for each type of observable distress. Deduct values are a function of distress type, severity, and extent. Deduction for each distress type is calculated by multiplying distress weight times the weights for severity and extent of the distress. Distress weight is the maximum number of deductible points for each different distress type. The mathematical expression for PCR is as follows:

$$PCR = 100 - \sum_{I=1}^{n} Deduct_i \qquad (1)$$

Where:

n = number of observable distresses, and
Deduct = (Weight for distress) (Wt. for severity) (Wt. for Extent)

The Appendices A-D that follow describe various distresses for rigid, flexible, and composite pavements and current guidelines for establishing their severity and extent. Three levels of severity (Low, Medium and High) and three levels of extent (Occasional, Frequent, and Extensive) are defined. The definition for distress type, severity, and extent must be followed closely and be clearly understood by field personnel if the rating method is to provide meaningful data. To illustrate the method for calculating PCR, consider the distress "Faulting" in a hypothetical jointed concrete pavement. If the severity of this distress in the pavement is "Medium" and extent is "Frequent", then, the deduct points for "Faulting" in the pavement would be equal to [(10) (0.7) (0.8)] or 5.6 (see Table on page 11 for the weights of this distress). If an extensive amount of medium severity "Surface Deterioration" is also observed the deduct points for this distress would be equal to [(10) (0.7) (1)] or 7.0. The PCR for the pavement based upon these 2 distresses would equal to:

$$PCR = 100 - (5.6 + 7.0) = 87.4 \qquad (2)$$

The deduct weights for each pavement type have been developed on the basis of the review of the rating methods developed in the United States, Europe, and Canada and the experience gained from the rating methods developed by the Resource staff as a result of studies conducted in this connection. Two premises were considered when assigning the weights:

1. Overlaying and/or rehabilitation of high type (multi-lane) roadways should be considered when the PCR drops within the range of 65 to 55.

2. Deteriorated pavements normally exhibit several different types of distress. Rarely is only a single type of distress observed for a particular pavement.

The first premise is useful in establishing a target value for the proper PCR of pavements that are in a certain state or condition. Roadways scheduled for rehabilitation and resurfacing have to be rated by the PCR procedure.

A Pavement Condition Rating (PCR) Scale was developed to describe the pavement condition using the PCR numbers calculated from Equation (1). This scale has a range from 0 to 100; a PCR of 100 represents a perfect pavement with no observable distress and a PCR of 0 represents a pavement with all distress present at their "High" levels of severity and "Extensive" levels of extent. Figure 1 illustrates the PCR Scale and the descriptive condition of a pavement associated with the various ranges of the PCR values.

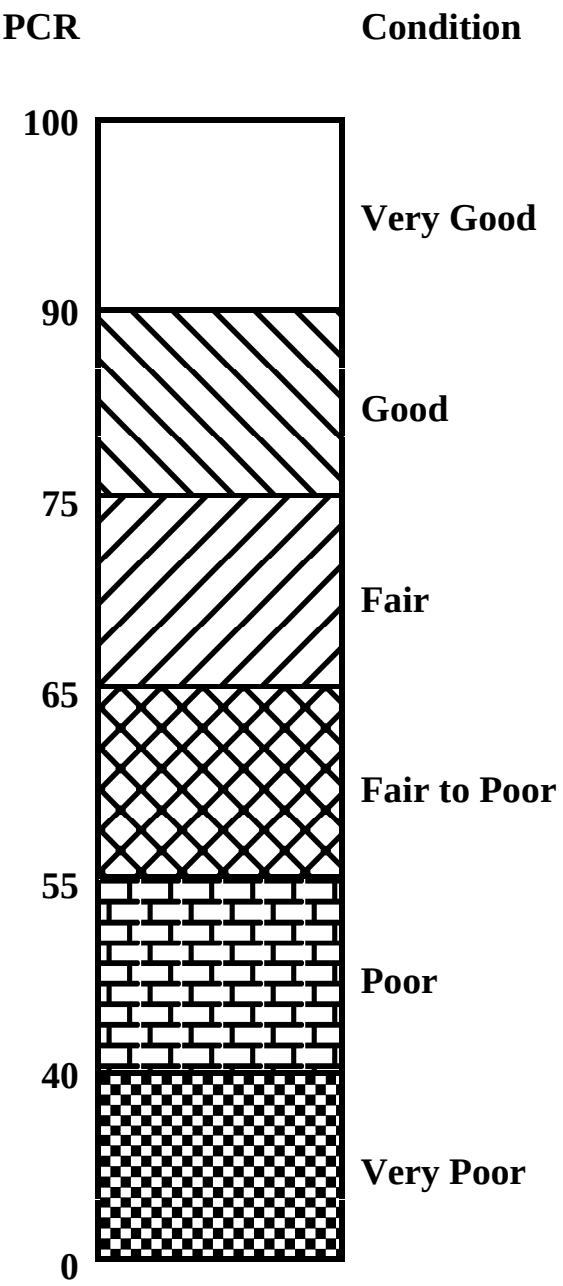

Figure 1. Pavement Condition Rating (PCR) Scale

FIELD MONITORING PROCEDURE

The pavement condition rating is intended to apply to the entire pavement section being monitored. Section lengths are established by the monitoring procedure, with the average length being from 3 to 5 km (2 to 3 miles). Directional lanes of multilane roadways are considered separate roadways by the monitoring procedure. On multilane roadways the heaviest traveled lane (usually the outside lane) should be rated. For two lane roadways, rating one direction is sufficient unless a significant difference in condition is observed between the two lanes. The monitoring procedure checks the variance of the Pavement Serviceability Index (PSI) within a section to limit section length. This limitation should produce sections that have a fairly constant visual condition. If a definite variation in condition is observed within a section, the section should then be subdivided for condition rating. Recording of visible distress for the PCR calculations involves three steps:

Step 1. The rating team (the rating team should consist of a Driver and a Rater) should ride the predetermined roadway section at a speed of about 60 km (40 MPH). During this step, readily visible distresses such as potholes, bleeding, settlement, faulting, spalling, and surface deterioration should be rated. Also the need for subdividing the section should be evaluated in step 1.

Step 2. A second pass along the roadway section should be made with stops at approximately 1.5 km (1 mile) intervals. For example, a 3 km (2-mile section) would require 2 stops to be made. At each stop the raters should evaluate the roadway by viewing 30 m (100') of the pavement. Close inspection of pavement cracking, crack sealing, rutting, raveling, joint spalling, D-cracking, and other visible distress should be made by viewing the pavement from the roadway shoulder.

Step 3. Complete the PCR form. The final rating form for the roadway section should represent the observed average of visible distress for the entire section. Separate rating forms based upon the step 1 observations and the individual stops made during step 2 are not required. However, raters may wish to use additional rating forms for each stop, simply for note keeping purposes.

PAVEMENT CONDITION RATING FORMS AND KEY FORMS

Note: The Key forms summarize data presented in Appendices A through D. These key forms will aid field personnel in establishing distress severity and extent while performing the PCR surveys.