

Standard Practice for Evaluating The Performance of Crack Sealing Treatments on Asphalt Surfaced Pavement

AASHTO Designation: PP20-95¹

1. Scope

1.1 This practice provides a guide for evaluating the performance of crack treatments applied to asphalt surfaced pavement. The procedures contained in this practice apply to the evaluation of formed in place crack sealers that have been installed either with or without bond breakers.

1.2 This is a performance-based practice for the evaluation of formed in place crack treatments that have been installed on asphalt surfaced pavements.

1.3 This practice can be used for the evaluation of cold applied thermoplastic sealers, hot applied thermoplastic sealers, and chemically cured thermosetting sealers. The sealers may have been installed with or without bond breakers.

1.4 *This practice may involve hazardous materials, operations, and equipment. It does not purport to address all of the safety problems associated with its use. It is the responsibility of whomever uses this practice to consult and establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 SHRP Document:

SHRP-H-348, Asphalt Pavement Repair Manuals of Practice

3. Terminology

3.1 E (Effectiveness) - crack treatment performance expressed as a percent of the total length of cracks treated that are performing as intended.

4. **Summary of Practice** - This practice presents a procedure for the evaluation of crack treatments that have been applied to asphalt surfaced pavements. It utilizes a series of field measurements and observations to quantify the performance of crack treatments. Projected life of a treatment is estimated by graphical

extrapolation of a function depicting treatment effectiveness versus time.

5. Significance and Use

5.1 This practice presents detailed procedures for evaluation of crack treatments used on asphalt surfaced pavements. Measurements and observations indicated in this practice are used to determine the effectiveness, in percent, with respect to time for the crack treatment. The procedures in this practice can be performed rapidly. A minimum of 1 evaluation each year is needed to provide an estimation of performance for crack treatments that have not been previously evaluated. Mid winter evaluations are the most effective since they provide information during a time of maximum pavement contraction and near maximum crack opening. It is suggested that the first inspection be made during the first winter and again after winter to assess winter damage. From these findings, projected performance of the crack sealing treatment can be established at a selected effectiveness level.

5.2 This practice can be used for the evaluation and (or) selection of crack sealant or filler materials, placement configurations, and finishing operations.

5.3 This practice is useful for planning future crack treatment needs.

6. Apparatus

6.1 Measuring wheel or other device for linear measurement of cracks.

6.2 Measuring device suitable for measuring the estimated width of cracks (i.e. dial caliper, metal ruler, etc.).

6.3 Brushes suitable for removing any accumulated traffic debris from crack surfaces.

6.4 Traffic control system in accordance with the latest edition of Manual of Uniform Traffic Control Devices (MUTCD).

Approved in October 1994, this provisional standard was first published in March 1995. Reconfirmed January 2000.

6.5 Personal safety equipment required for work performed on roadways open to traffic (i.e. hard hat, reflective clothing etc.).

7. **Hazards** - Observe the safety procedures required by the Agency and OSHA for activities performed on roadways open to traffic.

8. Sampling

8.1 Determine the length of pavement for evaluation. Generally, pavement sections that have crack treatments using the same type of sealant or filler, and the same installation procedures, are grouped together for evaluation. When different treatments are to be compared, each treatment is sampled separately.

8.2 Using a random selection procedure, locate an unbiased sample of the pavement, with a minimum length of 150 meters and a minimum width equal to the width of the traveled way in one direction, for testing.

8.3 When the pavement section has been previously evaluated, it is desirable to locate and reevaluate the same sample section that was randomly selected for the first evaluation. This allows previous sketches and graphs to be updated and compared. If it is decided to use different sample sections each year, use a stratified random procedure to locate a minimum of 5 sample sections each year for the evaluation. This will minimize data anomalies caused by localized differences in crack occurrence.

9. Preparations

9.1 Install the traffic control system as required by the MUTCD.

9.2 Determine and record the type of sealant or filler used. This may require that information be obtained from the maintenance section and visually confirmed in the field.

9.3 Classify and record the placement and finishing configuration(s) used in accordance with Figures 1 and 2. Some configurations require that information be obtained from the maintenance section and visually confirmed, with respect to surface characteristics, in the field.

9.4 Determine and record any other factors concerning installation procedures that the evaluating agency feels may have a significant effect on performance.

10. **Standardization** - Verify that the measurement devices are functioning as intended.

11. Procedure

11.1 Measure and record the length of cracks in the sample to the nearest 300 mm.

11.2 Measure and record the estimated width of cracks in the sample to the nearest 2 mm. This section may be optionally omitted if the evaluating agency has determined that crack width will not be useful in the final evaluation process.

11.3 Visually examine each crack in the sample to determine how well the treatment is performing its function of preventing the infiltration of water. Classify each failing segment in accordance with Table 1.

11.4 Measure and record the length and failure category of all crack sections identified as failing in Section 11.3.

11.5 Measure and record the estimated width of crack sections identified as failing. This section may be optionally omitted if the evaluating agency has determined that crack width will not be useful in the final evaluation process.

11.6 Indicate the failing segments.

12. Calculations

12.1 Calculate the Effectiveness of the crack treatment in accordance with the following formula for each sample section.

$$E = ([T_{CL} - T_{FL}] / [T_{CL}]) 100$$

where:

E	=	percent effectiveness of crack treatment
T _{CL}	=	total(sum of) crack lengths in sample section
T _{FL}	=	total(sum of) failed crack lengths in sample section

12.2 This is an optional section intended for use by evaluating agencies that have determined crack width will be useful in the evaluation process.

12.2.1 Group the failed crack lengths, for each sample section, into suitable class intervals based on width of cracks.

12.2.2 Calculate the percent of ineffective crack treatment, for each sample section, attributable to each class interval of crack width in accordance with the following formula.

$$I_n = \frac{T_{FLn}}{T_{CLn}} \times 100$$

where:

I_n = Ineffective crack treatment length for crack widths in a given class interval, expressed as a percent of the total crack lengths in the given class interval.

T_{FLn} = Total(sum of) failed crack lengths in a given class interval, n.

T_{CLn} = Total(sum of) crack lengths in a given class interval, n.

n = A particular class interval of crack widths.

12.2.3 Graph the term E versus service time in years. If previous evaluations on the sample section are available, enter each previously determined value on the graph as E indicated in the example in figure 3. If more than one sample section is used to evaluate a particular crack treatment, average the E values and graph the resulting E.

13. Report

13.1 Include the following information in the report on evaluation of crack treatment performance.

13.1.1 Project identification and location of sample section.

13.1.2 Type of sealant and/or filler used. List laboratory test reports on the materials, if known.

13.1.3 Classification of placement and finish configuration(s) used.

13.1.4 Effectiveness of treatment, E, (or average E if more than 1 sample section is used for a particular evaluation).

13.1.5 Percent of ineffective treatment for each class of crack widths, I_n (if determined).

13.1.6 Attach a copy of the plan view of the sample section(s).

13.1.7 Attach a copy of the crack treatment evaluation graph.

14. Precision and Bias

14.1 Precision

14.1.1 The research required to determine the precision of this procedure has not been conducted.

14.2 Bias

14.2.1 The research required to determine the bias of this procedure has not been conducted.

15. Key Words - Asphalt pavement crack sealant/filler, performance, evaluation.