FROM: HQ AFCESA/CES
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SUBJECT: **Engineering Technical Letter (ETL) 97-14: Procedures for Airfield Pavement Condition Index Surveys**

1. Purpose. This ETL authorizes use of ASTM D-5340-93 for airfield pavement condition index (PCI) surveys, and provides additional criteria for measuring distress severity of porous friction course (PFC) and Portland cement concrete.

2. Application: All Air Force organizations with pavement construction responsibility.

2.1. Authority. This ETL supplements AFR 93-5, *Procedures for US Army and US Air Force Airfield Pavement Condition Surveys.*

2.2. Effective Date: Immediately.

2.3. Expiration: Remains in effect until replaced by AFJMAN 32-1038, *Procedures for Airfield Condition Survey.*

2.4. Ultimate Recipients:

- MAJCOM and Base Civil Engineers
- Air Force or Contractor personnel performing airfield PCI surveys on Air Force installations

3. Referenced Publications:

- ASTM D-5340-93, *Standard Test Method for Airport Pavement Condition Index Surveys*

4. Background.

4.1. Porous Friction Course. PCIs for several PFC pavements in the United Kingdom were not true indicators of the life of the pavement. Some pavements that were rated VERY GOOD and EXCELLENT failed six months later. A more accurate quantitative analysis of raveling and weathering distress has been developed for PFC pavements (paragraph 5.1).

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4.2. Alkali-Silica Reaction. The ASTM PCI survey procedure also overrated- several pavements with ASR. Some pavements that were rated GOOD should have received a POOR rating. Surface cracks (scaling, map cracking, and crazing) are currently used to determine deduct values for ASR. However, ASR in hairline cracks can penetrate the entire slab. These penetrations are more critical than surface cracks and require larger deduct values (paragraph 5.2).

5. Requirements.

5.1. Porous Friction Course (PFC). Apply the following definitions of low, medium, and high severity raveling and weathering of PFC and use the deduct curves for asphalt raveling/weathering distress.

5.1.1. Low Severity: Between five (5) and twenty (20) missing aggregate pieces and/or no more than one (1) missing aggregate cluster within a 0.09-square-meter (1-square-foot) representative sample.

Note: An aggregate cluster consists of 2 or more adjoining aggregate pieces.

Figure 1 shows a PFC surface with no raveling or weathering. The surface in Figure 2 is missing two aggregate pieces and one aggregate cluster.

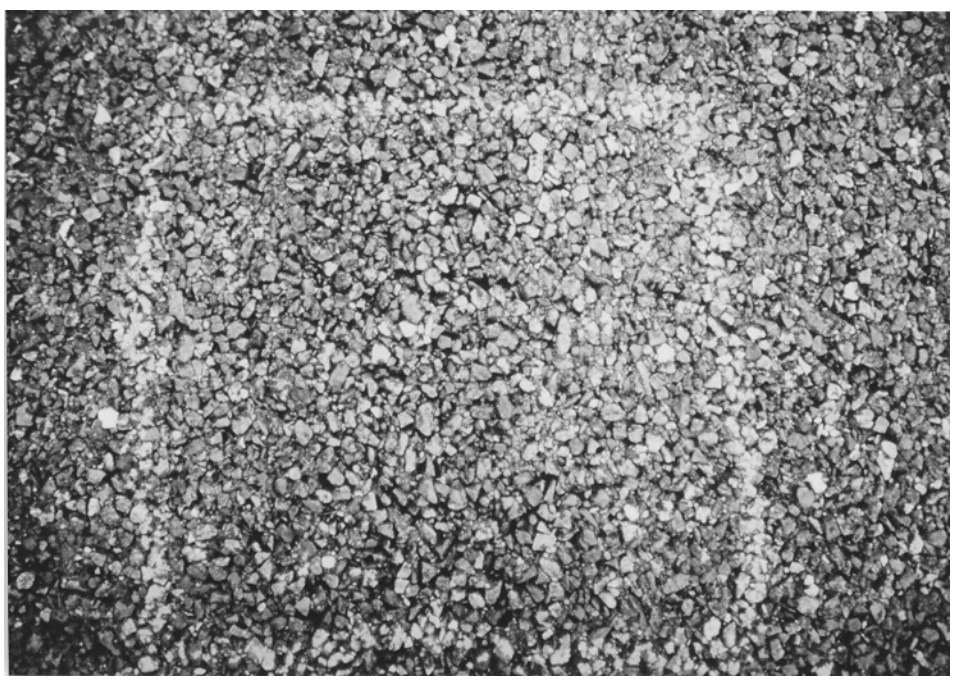

Figure 1. Typical PFC Surface With No Raveling or Weathering

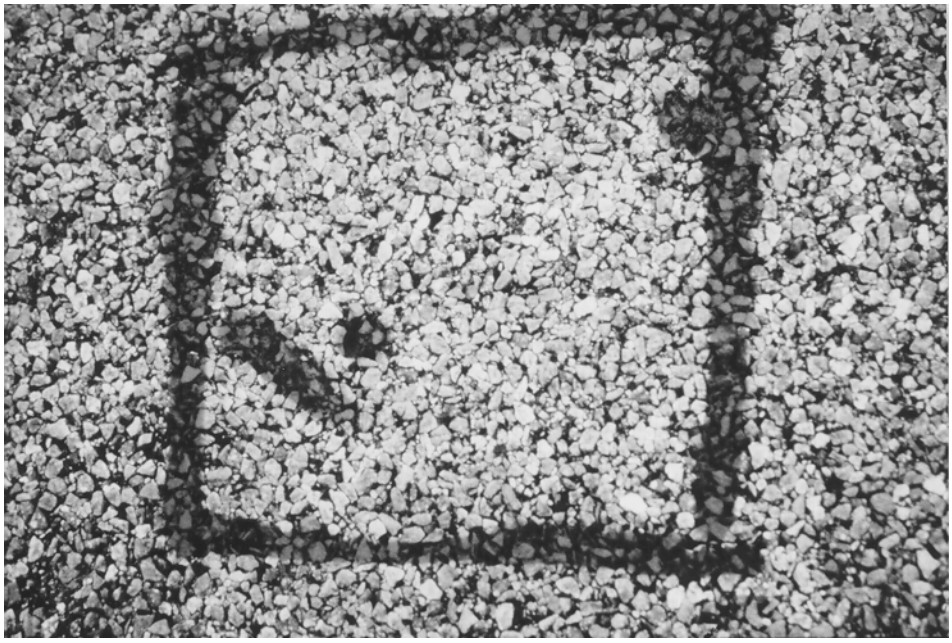

Figure 2. Low Severity Raveling/Weathering in PFC Surface

5.1.2. Medium Severity: Between twenty-one (21) and forty (40) missing aggregate pieces or more than one (1) missing aggregate cluster that together account for less than 25 percent of a 0.09-square-meter representative sample. In Figure 3, no single aggregate pieces are missing, but there are six (6) missing aggregate clusters accounting for less than 25 percent of the area. Figure 4 shows seven (7) single aggregate pieces missing, as well as five (5) missing aggregate clusters accounting for less than 25 percent of the area.

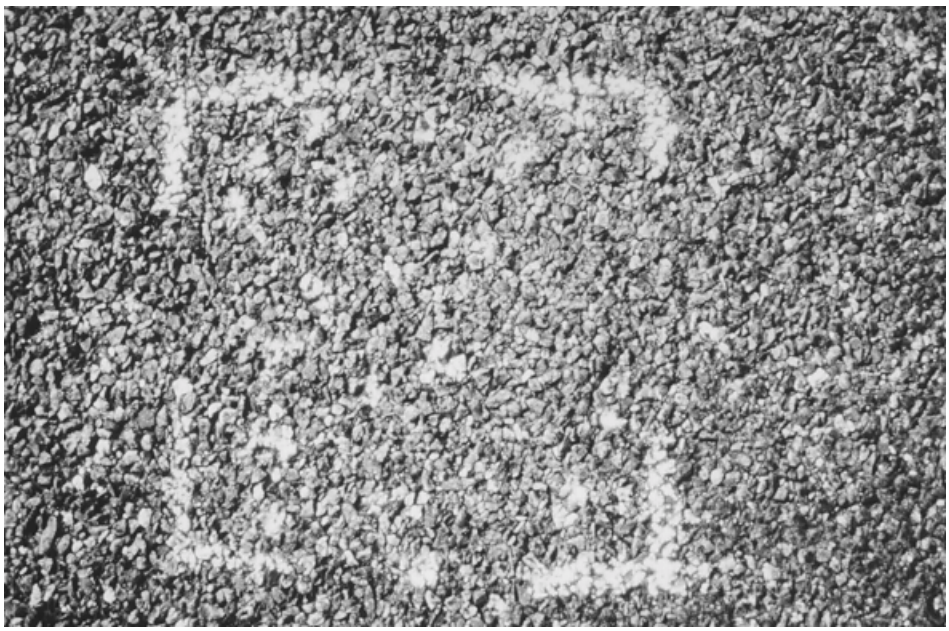

Figure 3. Medium Severity Raveling/Weathering in PFC Surface

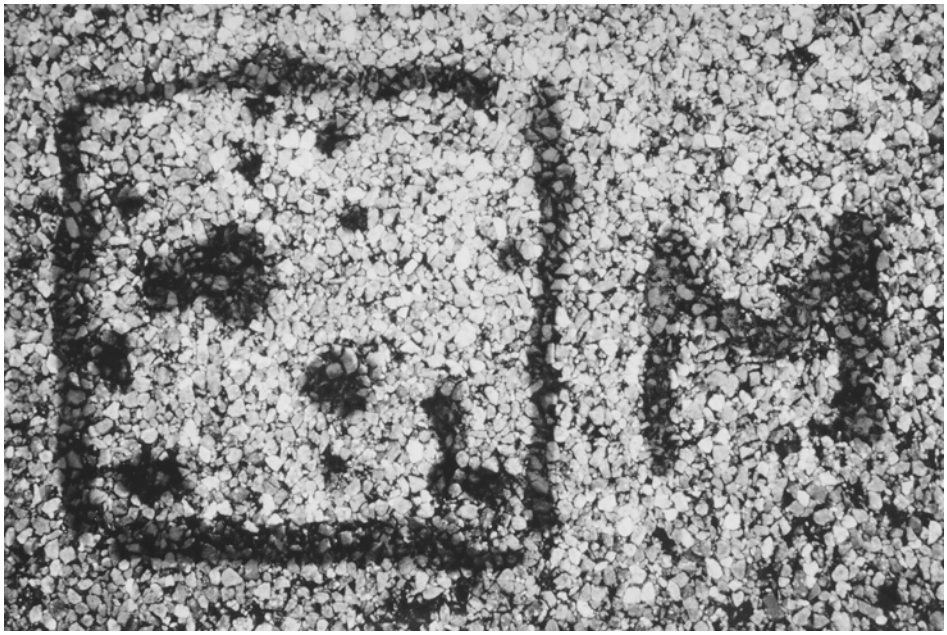

Figure 4. Medium Severity Raveling/Weathering in PFC Surface

5.1.3. High Severity: More than forty (40) missing aggregate pieces and/or missing aggregate clusters accounting for more than 25 percent of a 0.09-square-meter representative sample. The high severity shown in Figure 5 results from missing single aggregate pieces and missing aggregate clusters that together account for more than 25 percent of the area.

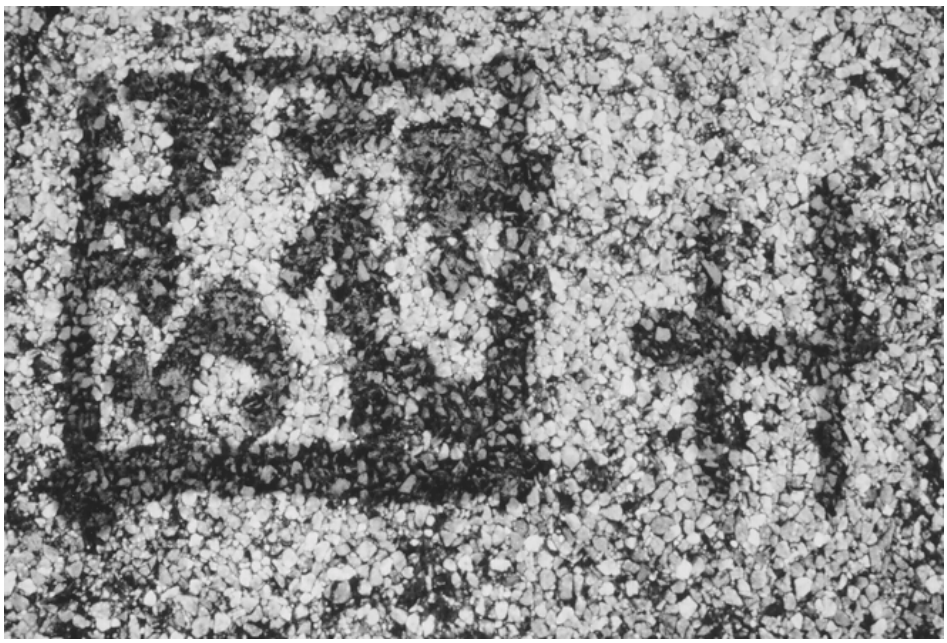

Figure 5. High Severity Raveling/Weathering in PFC Surface

5.2. Alkali-Silica Reaction (ASR) in Portland Cement Concrete (PCC). Apply the following definitions of low, medium, and high severity alkali-silica reaction in PCC and use deduct curves for durability cracking in PCC.

5.2.1. Low Severity: ASR can be detected in a limited area of the slab, such as one or two corners, or along one joint, and produces no foreign object debris (FOD). The area in Figure 6 could be categorized as low or medium severity ASR, depending upon the extent of coverage over the slab.

NOTE: As described in AFR 93-5, a slab is a defined unit, and distress on a number of slabs out of a larger group of slabs defines a percentage.

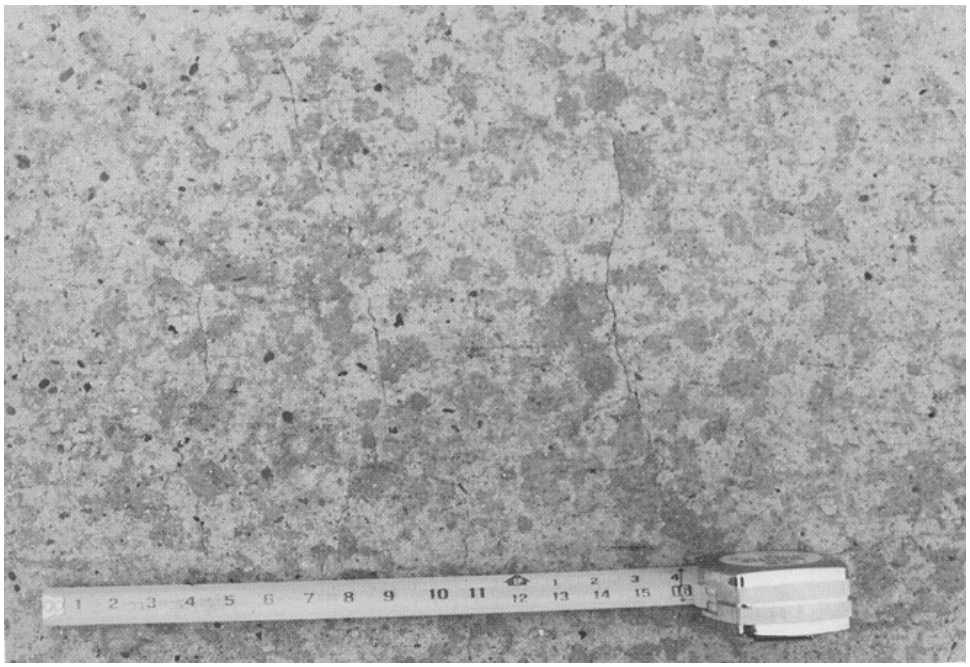

Figure 6. Low or Medium Severity ASR on a PCC Slab

5.2.2. Medium Severity. ASR can be detected over a considerable area of the slab, but there is no loose aggregate or FOD potential.

5.2.3. High Severity. ASR causes scaling and produces FOD. FOD produced by high severity ASR is visible in the lower part of Figure 7.

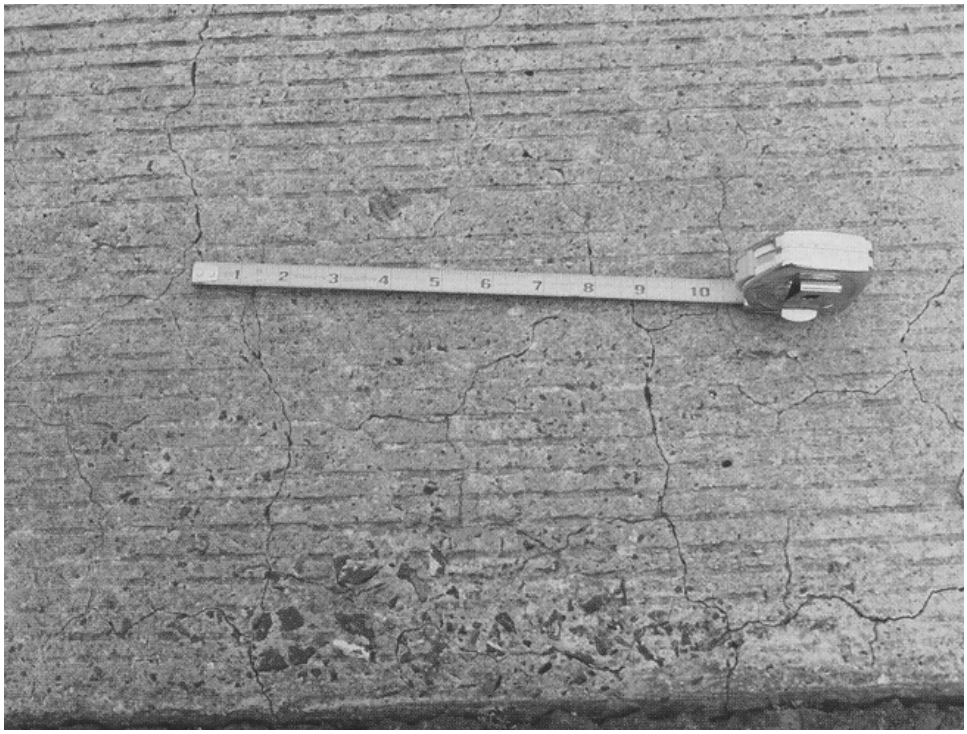

Figure 7. High Severity ASR on a Grooved Pavement

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