The Pennsylvania Local Roads Program

Identifying Asphalt Fatigue Cracking

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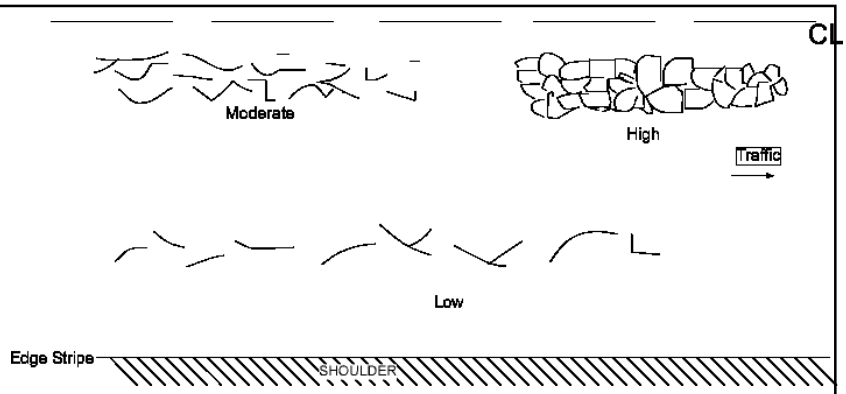
This is the first tech sheet in a series designed to help municipalities identify and address different types of pavement distress. The sheet looks at fatigue cracking.



The diagram above shows examples of the different levels of severity for fatigue cracking. As shown in the diagram, fatigue cracking most often occurs in the wheel paths. At its most severe level, the cracking forms the chicken wire or alligator pattern.

Municipalities who use even the simplest pavement management system rely heavily on accurate information from surface condition surveys. This tech sheet is the first in a series designed to help workers quickly identify various types of pavement distress and consistently classify them according to their level of severity.

One of the most common forms of pavement distress is cracking. There are several types of cracking, each with its own unique cause and remedy. Cracking types include:

- Fatigue
- Block
- Edge
- Longitudinal
- Reflection
- Transverse

Once the type of cracking is identified, the severity of the cracking can be classified as low, medium, or high. Municipalities may then record the information in their pavement management program, and develop a strategy to prioritize and address the pavement distress.

FATIGUE CRACKING

Fatigue cracking occurs in areas subjected to repeated traffic loadings such as wheel paths. In the early stages, the cracks are interconnected. As they develop, the cracks form multi-sided, sharp angled pieces usually less than a foot on their longest side. The shapes form a chicken wire or alligator skin shaped pattern. This type of cracking is commonly called alligator cracking.

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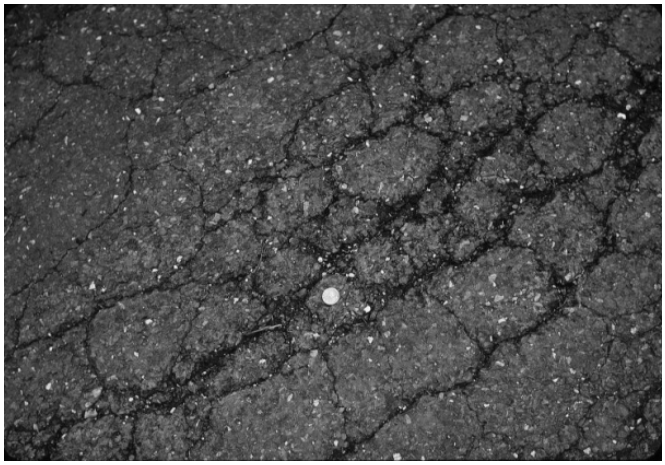
SEVERITY LEVELS

As stated earlier, fatigue cracks may be classified according to their severity levels. A low severity fatigue crack would be a distressed area with no or only a few connecting cracks. The cracks are not spalled or sealed, and they show no evidence of pumping.

Pavement is said to be spalling when it is cracking, breaking, chipping or fraying within 2 feet of a joint or crack. Pumping is the condition where water and fines are ejected from underneath the pavement from the pressure of passing traffic.



This picture illustrates moderately severe fatigue cracking. The cracks have formed a pattern, and are slightly spalled. However, there is no sign of pumping.

A moderately severe fatigue crack is one where the cracks are interconnected and form a pattern. The cracks may be slightly spalled or sealed. At this stage there is still no sign of pumping.

When fatigue cracks reach the high severity level they form a complete pattern of moderately or severely spalled interconnected cracks. Some pieces may even move when traffic drives over them. The cracks may be sealed. In severe cases, fines may be observed on the surface indicating pumping has taken place.

HOW TO MEASURE

The distressed areas should be measured. The area, expressed in square feet, should be recorded for each severity level. If an area shows signs of more than one severity level, record it as the highest level present. For example, if an area shows some signs of moderate severity and some of high severity fatigue cracking, classify the entire area as high severity.

This is an example of high severity fatique cracking. The pattern is well-developed, and the interconnecting cracks are spalled. The cracks are deep, and some of the sections are loose enough to move with passing traffic.

USING THE DATA

The distressed area's size and the severity are factors in determining an appropriate repair strategy. Repair strategies range from routine maintenance to reconstruction.

For more detailed information on pavement management, see the lead article, "The Pavement Management Process", in the Summer 2002 *Moving Forward.* Recent newsletters and tech sheets are available online at http://www.ltap. psu.edu. Related articles are available through the LTAP library. The library may be searched online through the publications section of the website.

Fatigue Cracking Severity Checklist

Low Severity Characteristics

- ✓ Cracks in wheel path, few if any are interconnected.
- ✓ No Spalling.
- ✓ No Sealing
- ✓ No pumping.

Medium Severity Characteristics

- ✓ Interconnected cracks form a pattern
- ✓ May have slight spalling or sealing
- ✓ No pumping

High Severity Characteristics

- ✓ Interconnected cracks form an alligator pattern
- ✓ Pieces may move with traffic
- ✓ Cracks may be sealed
- ✓ May show signs of pumping.