



Infrastructure Management Services

A GUIDE TO

KEY INDICATORS OF FAILING PAVEMENT

Infrastructure, Pavement, Costs, Education, Investment, Economy, Community





With billions of tax dollars being spent around the country on maintaining pavement infrastructure it is important to know how to spot a road in need of repair, before those repairs become critical and expensive. Some road rehabilitations are far cheaper than others and can help prolong a pavement segment's lifespan while sensibly optimizing a city's budget.

The most important things to recognize when doing a visual survey of a street are the types and quantities of pavement distresses that are present. The distresses measured can reflect the rehabilitation method that is best suited for each road segment. They can also provide a glimpse into the future condition of a roadway if it does not receive any rehab treatment. So, what are the different types of pavement distresses and how do they impact the overall lifespan and cost of rehabilitating a road?

For the purposes of pavement analysis certain types of distresses may have a more drastic effect on the overall pavement quality score.

TYPES OF PAVEMENT DISTRESSES

There are several different pavement distresses that are identified by the ASTM (American Society for Testing and Materials). These are separated into two categories, Load Associated Distresses (LAD) and Non-Load Associated Distresses (NLAD).

Below is a collection of the eight most common distresses that may be present on asphalt streets:

RAVELING

The loss of fine aggregate materials on the pavement surface measured by the severity and number of square feet affected. This is an NLAD caused primarily by normal weathering. This distress is also commonly found in areas where there is heavy traffic around a turning area and the friction of tires can cause the surface materials of the road to come loose. Raveling reduces the friction of tires and increases roughness on the pavement surface. Raveling can spread very quickly.



BLEEDING

The presence of free asphalt binder on the roadway surface caused by too much asphalt in the pavement or insufficient mixing of the aggregate materials. The result is a pavement surface with low skid resistance, especially when wet, and is measured by the amount and severity of the area. This is an NLAD that is commonly found in wheel paths.



PATCHING

An area of the road that has been replaced by new material to repair the existing pavement. A patch is always considered a defect no matter how effective it is. When the majority of a roadway surface is covered by a patch, such as a large utility replacement, the rating of the patch is minimized and the patch it is considered a NLAD. When a patch is used to cover a defect such as alligator or edge cracking it may reflect on the roads base strength.



LONGITUDINAL AND TRANSVERSE CRACKS

These are quantified by their length and width. These distresses are primarily due to weathering and not considered a LAD. Longitudinal and Transverse cracks that intertwine are the start of alligator cracking. Because of the relationship with more severe distresses such as alligator, block, and edge cracking, the appearance of longitudinal and transverse cracks are among the first visual signs that a road's base is beginning to fail. These cracks should be waterproof sealed as soon as possible to avoid further damage to the surface as well as the base of the pavement.



ALLIGATOR CRACKING

Alligator cracking or fatigue cracking is quantified by the severity of the failure and number of square feet. Even at low extents, this can have a large impact on the condition score as this distress represents a failure of the underlying base materials. It is one of the most common types of LAD and can spread rapidly if left unchecked.



EDGE CRACKING

Though edge cracking only appears on streets with unpaved shoulders, it can also be a sign of severe weakening of the pavement base. Edge cracking commonly occurs on rural roads without sufficient drainage. This allows water to seep under the surface of the street and begin eroding away at the base. Edge cracks may start forming from just outside the wheel path along the shoulder, but may spread very rapidly to the center of the street where much more damage will result in the form of alligator cracks and potholes. Drainage should be properly established so water cannot seep under the surface of the pavement.



WHEEL PATH RUTTING

Starting at a minimum depth of $\frac{1}{4}$ inch, wheel path ruts are quantified by their depth and the number of square feet encountered. Like alligator cracking, low densities of rutting can have a large impact on the final condition score. This is a LAD that is caused by vehicle movement shifting the underlying pavement materials and is considered a pavement distortion.



POTHOLES

These are commonly seen in areas with lower structural standards and poor drainage where an already present distress, such as alligator cracking, has filled up with water, enough that the soil beneath the pavement has begun to erode. Combine this erosion with continued pressure from street traffic and the surface asphalt is forced out of place. This creates a hole in the pavement where the asphalt surface is completely missing. Potholes are measured in severity from low at less than 25mm to high at over 50mm. Potholes can grow and become very dangerous if left unattended to. They can severely damage tires and vehicle suspensions, and even cause serious accidents. Potholes themselves are a NLAD but they are also usually a symptom of a much greater problem with the pavement base.



Here is a short list of the above distresses
and their recommended rehabilitation treatments:

RAVELING

Raveling is repaired by a patch or through the removal of the damaged pavement and a replacement overlay.

BLEEDING

Bleeding can be addressed through the light application of coarse sand (to absorb the excess asphalt binder) major bleeding should be shaved away using a motor grader or heater planer.

PATCHING

Patching is already, itself, considered a pavement rehabilitation, it is still important to make sure it is water proof sealed and smoothed into the existing pavement.

**LONGITUDINAL AND
TRANSVERSE CRACKS**

Most cracks of this type can be fixed through a waterproof sealing process. In the case that the cracking is severe (<1/2inch width) removal and replacement with an overlay may be needed.

ALLIGATOR CRACKING

For this type of distress, sealing is generally not going to be effective. If the cracking is small and localized it may be dug out and replace with a Patch. A large section of alligator cracking is a common first sign of pavement structural failure and must fixed with a strong HMA Overlay. If this does not happen the cracks will soon be replaced by potholes.

EDGE CRACKING

This type of cracking spreads very quickly so even light edge cracking should be waterproof sealed as early as possible. If the cracking becomes more severe, damaged areas of the road must be removed and replaced with an overlay.

RUTTING

Though slight rutting is often ignored until farther distresses are observed, heavy rutting (>1/3 inches deep) can be a concern and should be leveled and replaced by an overlay.

POTHoles

These can get substantially worse over time and present a major danger to motorists so, they must be replaced with patches and fillings as early as possible.

WHERE WE OPERATE



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