

## POSITION PAPER – TIRE SCUFFING AND INDENTATIONS

### **The Problem**

Newly constructed asphalt parking lots or driveways may occasionally exhibit surficial tire scuff marks and indentations particularly when opened to initial or early traffic. The occurrence of these marks is often exacerbated during periods of hot weather.

### **The Concern**

Owners of parking lots or driveways will often consider the appearance of scuffing and tire marking as a sign of poor quality resulting in a hot mix asphalt (HMA) that will not last as long as intended.

This is not the case! The scuffing and tire marks are typically a minor aesthetic problem that will not affect the long-term performance of the asphalt pavement.



*Typical view of tire marking in a pavement constructed to meet all OPSS standards but opened to truck traffic within 6 hours of paving.*

### **The Cause**

Many factors contribute to the cause of scuffing and tire marking.

- ❖ The switch to Performance Graded Asphalt Cement (PGAC) has improved the durability of the mix by reducing the incidence of cold weather cracking. However, in most cases, this has resulted in the use of a 'softer' asphalt cement, which has resulted in HMA mixtures that are more prone to tire scuffing, especially during periods of hot weather during the first season of use. The use of softer asphalts is further aggravated by other factors such as:



- Summer sun on newly paved surfaces (very black) can cause elevated temperatures at the surface of the asphalt;
- Front wheel drive cars tend to have higher loading on the front wheels which can cause higher contact pressures;
- Lower profile tires frequently have higher tire pressures resulting in increased stress;
- Just in time construction often results in parking lots being opened to traffic within hours or days of final paving; and

*Same pavement showing truck traffic to loading docks the morning after paving.*

- Tires fresh from periods of summertime highway driving are hot and can mark an already hot pavement.
- ❖ The design of the pavement surface itself in many cases is a significant contributor to the scuffing issue:
  - Parking lot mixes are typically specified to contain more sand or fine aggregate and the maximum size of the stone is smaller to promote a tighter surface texture and more aesthetically pleasing finish, which may make these mixes more sensitive to tire scuffing when they are warm;
  - More robust mixes designed with aggregates that are 100% crushed and with greater amounts of coarse aggregate may have a coarser, less aesthetically pleasing finish but will be more resistant to scuffing and indentation; and
  - Overall, structural design of the pavement must be adequate in order to have a pavement structure that accounts for the traffic loading expected (soft soil conditions under the pavement must be addressed at the design stage).
- ❖ Workmanship must also be considered but with today's advances in equipment, technology and Quality Control programs used in the industry, this issue is not normally the primary factor causing the scuffing. However, some issues related to construction could be influencing the problem, such as:
  - Construction equipment allowed on a newly constructed asphalt pavement will leave indentations and scuff marks; and
  - Low compaction in the hot mix asphalt as a result of light compaction equipment used on thin pavement structures.

For more information on pavement design of maintenance issues, consult the OAPC's ABC series on our website at [www.onasphalt.org](http://www.onasphalt.org).

### **The Fix**

There is no quick fix for scuffing or indentations without possibly causing more damage to the asphalt surface. Most marking will disappear in time under normal traffic conditions. Indentations greater than 5 mm in depth may be a tripping hazard or may hold water in the winter resulting in ice patches. These minor defects may have to be levelled by a mild reheating of the pavement and recompaction. In many cases, the fix may result in localized imperfections that may be more detrimental to the long-term appearance and performance of the pavement than the scuff marks that are being removed. Repair methods used should be evaluated to determine the long-term effect of the procedure.

### **The Long Term Effects**

Asphalt scuffing or marking is not a sign of a reduced pavement life. An asphalt pavement going through hot weather and marking will have, in the long run, the same life span as an asphalt pavement placed in cooler weather with no marking. If the problem is a weak subgrade, the result will usually be 'alligator skin' cracking of the asphalt pavement reducing its service life.

The structural design of the pavement must be tailored to the types of traffic and expected loading on the pavement. This may involve increased pavement thicknesses and the use of mixes with coarser aggregates and stiffer binders. Aesthetic appearance must be balanced with structural strength of the pavement.

### **The Conclusion**

A well-constructed parking lot showing signs of tire scuffing and marking will still meet the specified designed life expectancy. Tire scuffing is not a sign of poor workmanship or improper materials.



*Indentation left from parking of trucks on freshly laid pavement*