

Ohio Department of Transportation



Guidelines for Maintaining Adequate Pavement Friction in Surface Pavements

June 8, 2000

PURPOSE:

It is a given that Districts will pro-actively address known pavement friction problems. The following guideline is to help Districts isolate and correct causes of poor pavement skid resistance.

SCOPE:

This guideline includes a method of evaluating the potential causes of poor skid resistance and appropriate responses. Included is the method by which an aggregate source can be restricted based on a history of poor pavement friction. This guideline applies to surface pavement requirements only.

DEFINITIONS:

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| JMF | Job Mix Formula - Documents having an accurate record of all materials and materials configuration used in a surface pavement. |
| Microtexture | The surface characteristics of an individual particle of aggregate. |
| Macrottexture | The surface characteristics of a pavement determined by the type, size and amount of particular aggregate particles used in a pavement. |
| OMM | Office of Materials Management |
| Skid resistance | The ability of the traveled pavement surface/ vehicle tire interaction to resist loss of tire traction in stopping or maneuvering a vehicle. It is affected by roadway alignment, driver habits, tire condition and type, the aggregate used in the pavement, and by the weather. |

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| Pavement Friction | The description of a pavement surface as it affects skid resistance. |
| PF-RT | Pavement Friction - Review Team. The review team shall consist of at least one Central Office person, one involved District person, one Ohio Aggregates and Industrial Minerals Association (OAIMA) representative and one representative of the association for the pavement type in question. |
| Polishing | The process by which aggregate microtexture changes over time resulting in poorer PF. |
| SN | Skid Number - As determined by ASTM E274 |
| SR | Designation given to OMM record of aggregate source quality denoting aggregate prone to rapid polishing. |

GUIDELINE:

I. Determining Causes of Poor Skid Resistance

A. Collection of Data - The District should collect all pertinent data pertaining to the pavement section in question. Included should be the following.

1. Description of the problem including location, pavement alignment and general condition.
2. History of the problem including supplier/ contractor issues, anecdotal knowledge of District personnel, accident reports, or other pertinent information.
3. Data on all materials used in the surface pavement including JMF and visual examination of macrotexture.
4. SN and/or other data such as from laboratory tests.

B. Analysis of Data - The District should determine the cause or causes of the problem (from a pavement standpoint) and document the analysis. The following should be used in this analysis.

1. Alignment - Are there stop conditions, slopes, or curves or are there obstacles that impede traffic flow? Any of these in conjunction with a known loss of skid resistance is a likely factor.
2. Pavement condition
 - a. If the pavement is less than 3 months old and is an asphalt pavement the asphalt binder has possibly not completely worn off to expose the aggregate microtexture for expected pavement friction

- b. If the pavement is old in its expected life, normal long term aggregate polishing is one likely cause regardless of alignment.
 - c. If the pavement is only 1 to 4 years old, previous pavements have performed well and a significant skid resistance problem exists then it is very likely excess aggregate polishing has taken place.
 - 3. SN
 - a. Does the SN show relatively average to good numbers? If so, alignment may be the significant factor.
 - b. Does the SN show relatively average to poor numbers? If so, aggregate polishing may be the significant factor although alignment is not necessarily ruled out.
 - 4. Type and source of aggregate
 - a. Is this the first time a significant problem has occurred with a pavement using this aggregate?
 - b. Is there a history of pavements with significant problems occurring with this aggregate?

II. Solutions to determined Skid Resistance Problems

- A. If a serious problem exists the pavement should quickly receive a grinding, overlay, surface treatment or other suitable treatment. The severity will dictate the speed with which a repair should be programmed.
- B. If it is determined from the analysis an alignment problem is creating a skid resistance problem that will not go away with normal pavement treatments, then the alignment will be addressed. This may include different traffic control methods such as reduced speed, etc.

If re-alignment is not practical, consideration will be given to special skid resistant pavement (microsurfacing, open graded surface course, high skid resistant aggregate requirements, etc.).
- C. If it is determined that the aggregate source is a significant factor in the poor skid resistance the source may be restricted in it's future use in pavement surfaces if the following are closely followed and provided any obvious alignment issues are addressed where practical.
 - 1. At least three (3) projects must have used the same source and exhibit a similar degree of problems.

2. All data and history as in I.) A.) above must be collected for additional projects in which problems have existed.
 3. The data must be submitted to the OMM for a review by the PF-RT.
- III. If the PF-RT determines that the aggregate does indeed need to be restricted then this should be accomplished in the following manner.
- A. The aggregate source should be given an additional designation of SR by the OMM and should be restricted in use in surface courses.
 - B. The restricted source may only be used in surface courses by blending each JMF SR component size in a blend of 50 percent with a same component size polish resistant aggregate. 65% crushed gravel, natural sand and air cooled slag are known polish resistant aggregate. Other polish resistant aggregates must be approved by the OMM.
 - C. A source may have an SR designation removed or blending requirement changed by contacting the Office of Materials Management (OMM) in writing with data pertaining to mining or processing changes. The OMM will work with the PF-RT and District(s) in review of this information. Changes in blending or trial projects will be in agreement with the District and according to the guidelines for evaluating aggregate blends for skid resistance.

TRAINING:

Questions regarding this guideline can be directed to the OMM. As much of this policy follows formerly undocumented District practice no formal training of Districts is necessary.

FISCAL ANALYSIS:

Following this guideline may lead to increased cost to the District should a pavement re-alignment need to occur or local aggregate source be restricted. However, regarding aggregate restrictions, since past practice has been to completely disallow aggregate types based on source specific problems this guideline will lead to less cost to the District in some cases.