

SLURRY SEALS

PROCESS DESIGN OVERVIEW

1 SCOPE

A slurry seal is used as an economical maintenance treatment. A slurry seal can be placed on an existing road that is starting to show some distresses. Slurry seals are ideally suited for the following:

- Correct minor surface imperfections
- To enrich a dry, weathered or oxidized surface.
- To prevent moisture and air from penetrating through the existing surface.
- To develop a skid resistant surface or improve the existing surface condition.

1.1 DEFINITIONS

Slurry Seal:

Slurry seal is a mixture of well-graded fine aggregate, mineral filler, asphalt emulsion and water applied to a pavement as a surface treatment. It protects the existing surface from moisture intrusion, fills surface voids, cracks and minor depressions in the pavement, retards further oxidization of the existing pavement, provides a skid resistant surface and extends the service life of the existing pavement.

2 MATERIALS

2.1 Asphalt Emulsions:

A number of different types of asphalt emulsion can be used in slurry seals. The proper emulsion to be used has to be determined by running compatibility tests between the emulsion and the aggregate to be used. The most common emulsions used are SS-1h, CSS-1h, or CQS1-h with CQS1-h being the predominate one.

2.2 Mix Aggregate:

The type of mix aggregate used in slurry seals must meet certain requirements of shape, size, cleanliness and gradation. The asphalt emulsion to be used and the aggregate must be compatible to ensure the asphalt-aggregate bond is effective. There are three accepted gradations for the aggregate to meet;

- Type 1 – used on lower volume roads, parking areas or shoulders.
- Type 2 – most widely used gradation on moderate trafficked roads
- Type 3 – used on higher volume roads such arterial streets

Further information on the gradations can be found in the Basic Asphalt Emulsion Manual.

2.3 Mineral Fillers:

A small amount of additive may be added to the mixture to aid in controlling the break time and the setting of the slurry. Mineral fillers such as Portland cement, hydrated lime or fly ash may be added to aid in stabilizing and setting the slurry seal.

2.4 Water:

Water is used to aid in mixing and coating and controlling the consistency of the slurry seal. It should be potable and compatible with the mix.

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3 DESIGN CRITERIA

When designing a slurry seal a number of factors have to be examined and assessed to ensure a proper surface will be placed that will perform for its service life. The following factors can have a tremendous effect on the performance of a slurry seal; traffic, aggregate shape, existing surface and compatibility. If these factors are addressed the chances of a good slurry seal being placed are greatly increased.

Traffic: The type and quantity of traffic will have a large effect on the amount of asphalt emulsion to be used as well as the gradation of the aggregate.

Aggregate Shape: The overall shape of the mix aggregate can influence the quantity of aggregate as well as the amount of asphalt emulsion to be used. The angularity of the aggregate will affect the performance of the finished seal.

Existing surface: The texture and condition of the existing road surface will affect the aggregate type, quantity and emulsion rate.

Compatibility: If these factors are taken into consideration in designing the slurry seal then the chances of a successful seal are greatly improved. By blending all the materials in the proper proportions a semi-fluid , homogeneous slurry will be produced.

4 RECOMMENDED PERFORMANCE GUIDELINES

In order to construct a proper well designed slurry seal the following guidelines should be followed:

- Design a slurry seal with aggregate to be used on job.
- Use a hard durable screenings.
- Ensure compatibility of aggregate and emulsion
- Ensure a homogeneous condition of the mix.
- Calibrate and inspect all equipment.
- Follow proper construction techniques.
- Use traffic control to protect seal.
- Work only in weather suitable for placing slurry seal.

5 RESOURCES

1. "Basic Asphalt Emulsion Manual", Fourth Edition, Asphalt Institute and Asphalt Emulsion Manufacturers Association, 2008
2. "Recommended Performance Guidelines", Second Edition, Asphalt Emulsion Manufacturers Association, Annapolis Maryland, 2006
3. "Design Technical Bulletins", Fifth Edition, International Slurry Surfacing Association, Annapolis, Maryland, 2005
4. "Recommended Performance Guidelines for Emulsified Slurry Seal Surfaces", A-105, International Slurry Surfacing Association, Annapolis, Maryland, 2010.



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