

STOCKPILE MAINTENANCE COLD MIXES

PROCESS DESIGN OVERVIEW

1 SCOPE

The use of stockpiled maintenance mixes has been around for many years. These mixes can be produced in a number of different ways and with different asphalt emulsions as well as asphalt cutbacks. The mixes can be cold produced using a hot mix plant as the mixing platform, a pugmill operation or blade mixed on the ground and then stockpiled. The most common methods are in a pugmill or a hot mix plant.

1.1 DEFINITIONS

Stockpile Maintenance Mix

A stockpile maintenance mix is a graded mix produced in a cold mix plant or blade mixed to provide an economical cold mix to fill potholes and repair minor maintenance issues on roadways. These mixes can be produced in a pugmill or put through a hot mix plant without heat and then stockpiled for later use. The mixes use either asphalt emulsions or cutback asphalts as the binding agent.

2 MATERIALS

2.1 Asphalt Emulsions:

Several factors have to be taken into account when choosing the emulsion to be used. The type and grade of emulsion is affected by the aggregate, the coating ability, the compatibility, the mixing method, length of service expected. The most widely used grades of asphalt emulsion used in stockpile mixes are MS-2, MS2s, CMS2 and CMS-2s. Also cutback asphalts can be used but due to environmental regulations these are becoming less common. In recent years proprietary type emulsions have been developed for use in stockpile mixes.

2.2 Asphalt Cutbacks:

The most common asphalt cutbacks used for stockpile mix are SC 250 and MC 250. The SC grade is used for long term stockpiling and the MC grade for short term stockpiling. The use of cutbacks has been greatly reduced due to the environmental concerns.

2.3 Mix Aggregate:

The mix aggregate used in stockpile maintenance mixes can be processed or semi-processed crusher, pit or bank run aggregates. Most are graded from a maximum size of 25 mm with some material passing the 75 micron sieve. They should have very low clay content and not have an excessive amount of pass 75 micron material. They also can be blended as individual coarse and fine aggregates to produce the desired gradation.

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3 DESIGN CRITERIA

When designing a stockpile maintenance mix a number of factors have to be examined and assessed to mix are greatly improved. Typically a stockpile mix would require an emulsion content of 5.5 – 7.0% and a cutback ensure a proper mix will be developed that will perform for its service life. The following factors can have a tremendous effect on the performance of a stockpile mix; aggregate shape, mix workability, aggregate type, coating ability and residual asphalt content. If these factors are addressed the chances of a good stockpile mix being placed are greatly increased.

Aggregate Shape and Type:

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 more graded the aggregate is the higher the emulsion quantity needed. The compatibility of the emulsion used with the aggregate is critical.

Mix Workability:

The emulsion used should give the finished mix enough workability to be handled in cold temperatures and be homogeneous and be designed for the intended method of processing be it immediate use or in a long term stockpile.

Coating Ability:

The asphalt emulsion should have the ability to coat the fine aggregate (pass 4.75 mm) without the fine aggregate balling up. With some emulsions the use of mixing water will aid in coating the fines.

Asphalt Residual in the Emulsion: The quantity of asphalt residual in the emulsion can affect the quantity of emulsion needed to coat the aggregate. The lower the residual the higher the quantity of asphalt emulsion needed.

During the design process the two key factors that are needed is a well coated mix combined with adequate workability which will make it able to be handled.

If these factors are taken into consideration in designing the stockpile mix then the chances of a successful asphalt content of 4.5 to 5.5%



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4 RECOMMENDED PERFORMANCE GUIDELINES

In order to construct a proper well designed stockpile maintenance mix the following guidelines should be followed:

- Determine mixing process to be used.
- Determine binder to be used.
- Determine emulsion grade and type to be used is well designed for chosen mixing process.
- Design a dense graded mix with aggregate to be used on job.
- Use a clay free hard crushed aggregate having a well graded appearance.
- Ensure asphalt emulsion and aggregate are compatible.
- Ensure adequate emulsion is used.
- If cutback asphalt used ensure it is compatible with aggregate
- Ensure aggregate is moist but not saturated.
- Ensure the mix is workable and the fines are well coated.
- Follow proper mixing techniques.
- Ensure stockpile pad is clean and well drained.
- Work only in weather suitable for type and grade of emulsion being used.

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. "Asphalt Cold Mix Manual", MS-14, Asphalt Institute, Lexington, Kentucky



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