

301 LIME TREATED SUBGRADE

The subgrade may be treated to improve its ability to support traffic loads. The improved load carry capability occurs because the lime admixture reduces the volume change characteristics and plasticity of the soil.

301-2 Materials

The Special Provisions will specify which type of lime to use. Two kinds of lime may be used for lime treatment: dry hydrated or commercial (granular or pelted) quicklime.

Dry hydrated lime has had water added and chemically combined. Quicklime has not been combined with water.

The Standard Specifications allow the use of lime from different sources, but not from different sources to be mixed. The problem with mixing lime from different sources is that they may react differently and result in non-uniformity. Hydrated lime and quicklime cannot be mixed together, even if they are from the same source, because of the very different water demands, curing time, and general handling procedures.

Whatever kind of lime is used, it must be kept dry and free flowing. Storage time should be as short as possible.

301-3 Construction Requirements

301-3.01 Preparation of Roadbed

Before adding lime, the subgrade material to be treated is scarified, pulverized, mixed, and windrowed or re-laid. It may be necessary to remove oversize material (see Standard Specification Subsection 301-3.01). It is necessary to determine how much moisture is present in the existing subgrade to ensure a sufficient amount of water is processed into the material to facilitate both the mixing of lime and the pozzolanic reaction with the soil.

Windrows should be sized so that the mixer can easily process all the material at once. This may mean that several windrows will be needed. Running the mixer at its capacity limit, generally, means the mixer has to slow down to achieve thorough mixing. Even with the slow down, a nonuniform mix may result.

301-3.02 Application of Lime

The Special Provisions will specify the application rate for adding lime to the treated material. Whether applied to a windrow or on the shaped grade, the lime is applied by a mechanical device that can be adjusted to provide the correct spread within 10% of the amount specified.

Favorable weather is very important to the process. Cold weather will slow the reaction of the lime, and freezing will deprive the mix of the water needed. Rain can result in too much water that can either stop the process by dilution or wash out the lime. Windy conditions may cause safety and environmental problems especially when quick lime is used.

301-3.03 Mixing

Water is to be added only through the mixing machine so that optimum moisture can be closely controlled.

Quicklime needs more water than hydrated lime because the larger particles have to slake and become fine enough to hydrate. Slaking is the sloughing and falling apart of large pieces until only a fine powder results. A curing period is often necessary.

The tolerance specification for the lime applied should be followed closely because the benefit of adding extra lime is not proportional to the amount added. A minor increase is unnecessarily expensive without a proportional increase in quality. A minor decrease in the lime greatly decreases the quality.

After mixing and laying, the finished subgrade is to be kept moist (not sloppy wet) until the bituminous curing seal is applied. The cure should be applied as soon as possible.

All traffic, including the contractor's and ADOT's, must be kept off the treated area for three days.

301-3.04 Compaction and Finishing

Lime treated material should be compacted to a density of at least 100 percent of the maximum density unless the Special Provisions specify otherwise.

301-3.06 Safety Program

Both kinds of lime must be handled carefully because they can cause severe chemical burns, especially to the eyes. The Standard Specifications require the contractor to have first-aid treatment available. The minimum precautions are described in the Standard Specifications.

The Resident Engineer is responsible for providing the same first-aid facilities for ADOT employees. If a satisfactory arrangement can be worked out, it is acceptable for ADOT personnel to use the contractor's safety facilities.