LIME

ASSOCIATION OF TEXAS

Versatile Lime, Tested by Time

400 Stone Creek Ridge Dr.
McGregor, Texas 76657
(254) 723-LIME (5463) • www.LimeTexas.org

COMPLIMENTS OF THE

LIME

ASSOCIATION OF TEXAS

Austin White Lime | Lhoist | Texas Lime

For Additional Information Please Contact

Kelvin Reinhardt
Executive Director
Lime Association of Texas

Phone: (254) 723-LIME (5463)
Email: kelvinreinhardt@limetexas.org

Or Visit Our Web Site @
www.limetexas.org

DO and DON'TS FOR LIME STABILIZATION

DO

1. **Classify Soil** –
   Atterberg Limits
2. **Determine Lime Demand –**
   percentage by dry weight of soil
3. **Establish Moisture Density**
   Relation – Moisture-Density (MD) Curve
4. **Determine Strength –**
   Unconfined Compressive Strength (UCS)
5. **Bring Soil to Final Grade –**
   adjust for fluff
6. **Spread Lime Uniformly –**
   pounds per square yard
7. **Control Mix Depth –**
   stay as close to specified mix depth as possible

DO and DON'TS FOR LIME STABILIZATION

DO

8. **Mix Lime in Soil –**
   break down clay particles to less than 2.5”
9. **Use Enough Water –**
   2 to 3 percent over optimum moisture content (OMC)
10. **Seal off Mixture to Retard Carbonation and Facilitate Mellowing –**
    lightly compact
11. **Mellow for 24 Hours Minimum –**
    keep surface moist
12. **Remix After Mellowing –**
    achieve specified sieve analysis and OMC
13. **Compact Treated Soil per MD Curve –**
    keep surface moist until covered

DO and DON'TS FOR LIME STABILIZATION

DON'TS

1. **Don't Leave Lime/Lime Mixture Exposed to Carbon Dioxide in Air for Extended Period –**
   results in carbonation of lime - reduces available calcium

2. **Don't Over Mix Depth –**
   results in dilution of lime in the mixture – reduces strength

3. **Don't Starve Chemical Process for Water –**
   reduces strength - slows chemical reaction

4. **Don't Have too Much Excess Limed Scalping's –**
   no more than ½" for 8" mix depth - results in dilution – reduces strength

EXAMPLES OF DETERMINING LIME QUANTITIES

The following calculation is based upon Hydrated Lime (HL), if Quick Lime (QL) is used, the conversion factor is 1.28 in accordance with TxDOT specifications.

By Given Application Rate:

Length of Roadway – 750 feet

Width of Roadway – 35 feet

Depth of Treatment – 6 inches (.5')

Rate of Application – 30 pounds per square yard

750' × 35' = 26,250 sf ÷ by 9sf/sy = 2916.67 sy

2916.67square yards × 30 lbs/sy = 87,500 lbs

87,500 lbs ÷ by 2000 lbs/ton = 43.75 tons or rounded up to ***44 tons***

By Percent of Dry Weight of Soil:

Length of Roadway – 1500 feet

With of Roadway – 38 feet

Depth of Treatment – 6 inches (.5')

38' × 1500' × .5' = 28,500 cubic feet

28,500 cf × 110 lbs/cf = 3,135,000 lbs

3,135,000 lbs × 6% (.06) = 188,100 lbs

188,100 lbs ÷ by 2000 lbs/ton = ***94.05 tons***

Or

3' × 3' × .5' = 4.5 cf/sy

4.5 cf × 110 lbs/cf = 495 lbs/sy

495 lbs/sy × 6% (.06) = 29.70 lbs/sy

38' × 1500' = 57,000 sf ÷ by 9sf/sy = 6,333.33 sy

6,333.33 sy × 29.70 lbs/sy = 188,100 lbs

188,100 lbs ÷ by 2000 lbs/ton = ***94.05 tons***

PROBLEMS ASSOCIATED WITH ASPHALT PAVEMENTS

Major Road Distresses

1. **Moisture-Induced damage –** weakened bond between the bitumen and the aggregates.
2. **Rutting –** permanent deformation of the asphalt.
3. **Oxidation and Aging –** less elastic and more brittle pavements.
4. **Cracking –** traffic induced fatigue as pavement weakens with age.

SOLUTIONS TO PROBLEMS ASSOCIATED WITH ASPHALT PAVEMENTS

Benefits of Adding Hydrated Lime (HL) to Asphalt Mixtures

1. **HL improves the compatibility of asphalt binders and most aggregates.**

2. **HL improves the resistance of the mixture to fracture growth – it also improves fracture toughness at low temperatures.**

3. **HL behaves as an "active" mineral filler – it stiffens the asphalt binder without making it brittle.**

4. **HL favorably alters oxidation kinetics of the mastic – it reduces the damaging effects resulting in lower viscosities over time.**

5. **HL alters the plastic properties of clay fines contaminating the aggregates – it improves moisture stability and durability of the mixture.**

DO and DON'TS of HYDRATED LIME (HL) in ASPHALT MIXTURES

Benefits of Adding Hydrated Lime (HL) to Asphalt Mixtures

1. **Always use "hydrated lime" (HL) to produce high performance mixes. Don't use "quicklime" as it will damage the mixes. Don't use "agricultural lime" since it consists of non-reactive limestone. Don't substitute by-products for chemical grade HL since their composition is variable.**
2. **Always use fresh HL in test and field mixes. Always store HL in airtight containers or silos. Don't store HL for more than 6 months. The lime will oxidize and revert to limestone.**
3. **Always add HL based upon the total weight of the mixture.**
4. **Always determine the addition rate of HL based upon results from tests such as Hamburg Wheel Tester, Lottman tensile strength ratios, or other "performance" tests. Optimum HL percent will vary based upon aggregate composition, binder compatibility and/or mix design.**

DO and DON'TS of HYDRATED LIME (HL) in ASPHALT MIXTURES

5. **If moist aggregates are specified to insure that HL adheres to the stone always shoot for 3-5% surface moisture.**
6. **Always use a pugmill or belt plows to blend the HL with the aggregates.**
7. **If HL is added directly to the drum always insure that the addition location is immediately before (and close to) the point where the asphalt binder is added.**
8. **Always add HL in using a method that maximizes aggregate contact and/or intimate binder exposure.**
9. **Always select an addition method that will distribute the HL evenly throughout the mixture.**
10. **Always check the calibration and operation of the HL delivery system before every shift.**

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AUSTIN WHITE LIME COMPANY 1-800-553-LIME
LHOIST 1-888-888-8912
TEXAS LIME COMPANY 1-800-380-LIME
www.LimeTexas.org