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Examination for Soil Stabilization for Pavements

CHAPTER 1 - INTRODUCTION

1. Which of the following is not listed as an additive addressed in this manual?
 - a) Flyash
 - b) Bitumen
 - c) Silica
 - d) Lime
2. True/False: “Modification” implies the use of larger quantities of additives?
 - a) True
 - b) False
 - c) Not enough information for a specific answer
 - d) Too many variables for a specific answer

CHAPTER 2 – SELECTION OF ADDITIVE

3. What material is almost always used with lime in soils that have little or no plastic fines?
 - a) Cement
 - b) Bitumen
 - c) Fly ash
 - d) Asphalt
4. What must be done after determining the type of stabilizing agent to be used?
 - a) Approval must be obtained
 - b) Field testing must commence
 - c) Minimum engineering criteria must be established
 - d) Samples must be prepared and tested
5. Chemical reactions will not occur rapidly for cement-stabilized soils at what soil temperatures?
 - a) Less than 20 degrees Fahrenheit
 - b) Less than 40 degrees Fahrenheit
 - c) Less than 60 degrees Fahrenheit
 - d) Less than 80 degrees Fahrenheit

CHAPTER 3 – DETERMINATION OF STABILIZER CONTENT

6. Which type of Portland cement has a greater sulfate resistance?
- a) Type II
 - b) Type IA
 - c) Type III
 - d) Type I
7. The use of cement for fine-grained soils containing what percent of sulfate should be avoided?
- a) Less than 1 percent
 - b) More than 1 percent
 - c) More than 2 percent
 - d) More than 3 percent
8. What percent passing through a No. 40 sieve is required for a cement-stabilized sub-base course?
- a) 10 – 40 percent
 - b) 45 – 70 percent
 - c) 0 – 20 percent
 - d) 10 – 50 percent
9. What standard should be referenced if the objective of modification is to improve the gradation of a granular soil through the addition of fines?
- a) ASTM D 423
 - b) ASTM D 424
 - c) ASTM D 422
 - d) ASTM D 421
10. When determining the design cement content for cement-stabilized soils, a total of how many samples should be prepared?
- a) 3
 - b) 6
 - c) 9
 - d) 12
11. If quicklime is used, the design lime contents determined from this manual for hydrated lime should be changed by how much?
- a) Increased by 25 percent
 - b) Reduced by 25 percent
 - c) Reduced by 20 percent
 - d) Reduced by 5 percent

12. What is the preferred method of curing lime-stabilized soil samples used for testing?
- a) In a sealed container at 73 degrees F for 28 days
 - b) In an unsealed container at 73 degrees F for 28 days
 - c) At 120 degrees F for 48 hours
 - d) For 7 days in a humid room
13. What is another name for Class C fly ash?
- a) Coal ash
 - b) Low lime ash
 - c) High lime ash
 - d) Pozzolanic ash
14. True/False: Freeze-thaw and wet-dry durability tests are not applicable to asphalt-stabilized mixtures?
- a) True
 - b) False
 - c) Not enough information for a specific answer
 - d) Too many variables for a specific answer
15. Lime is used in bitumen-stabilized soils when the PI is what?
- a) Less than 5
 - b) Above 5
 - c) Above 10
 - d) Above 20
16. Expansive soils as defined for placement purposes are those that exhibit swell in excess of what?
- a) 1 percent
 - b) 3 percent
 - c) 5 percent
 - d) 7 percent
17. Soils with a low potential swell have a plasticity index of what?
- a) > 35
 - b) $30 - 35$
 - c) $25 - 30$
 - d) < 25

CHAPTER 4 – CONSTRUCTION PROCEDURES

4-1 Construction with Portland Cement

18. Which of the following is not listed as a type of mixing equipment used for construction with Portland cement?
- a) Windrow-type central mixing plant
 - b) Single-shaft flat-transverse traveling mixer
 - c) Batch-type pugmill central mixing plant
 - d) Windrow-type pugmill traveling mixer
19. Most specifications require that the soil material be pulverized sufficiently so that at the time of compaction what percentage will pass a No. 4 sieve?
- a) 100 percent
 - b) 90 percent minimum
 - c) 80 percent minimum
 - d) 70 percent minimum
20. True/False: Windrow-type traveling mixers will not pulverize friable soil materials?
- a) True
 - b) False
 - c) Not enough information for a specific answer
 - d) Too many variables for a specific answer
21. No lane should be spread so far ahead of adjoining lanes that a time lapse of more than how many minutes occurs between the times of placing material in adjoining lanes?
- a) 15 minutes
 - b) 30 minutes
 - c) 45 minutes
 - d) 60 minutes
22. During soil-cement finishing operations the surface should be what?
- a) Completely dried
 - b) Saturated with water
 - c) Kept damp
23. Bituminous materials used as a moisture-retaining cover during curing are applied at what rate?
- a) 0.15 to 0.30 US gallons per square yard
 - b) 0.30 to 0.45 US gallons per square yard
 - c) 0.45 to 0.60 US gallons per square yard
 - d) 0.60 to 0.75 US gallons per square yard
24. Soil-cement should not be placed when the temperature is below what?
- a) 20 degrees F
 - b) 30 degrees F
 - c) 40 degrees F
 - d) 50 degrees F

4-2 Construction with Lime

25. Pressure injections of lime slurry are usually placed at 5-foot spacing and at what depth?
- a) 5 to 7 feet
 - b) 7 to 10 feet
 - c) Less than 5 feet
 - d) 6 – 12 inches
26. The fluff action of the lime-stabilized layer is usually minimized if adequate water is provided and what else?
- a) Compaction is done immediately
 - b) Remixing of the material is done after compaction
 - c) The subgrade elevation is lowered
 - d) Mixing is done shortly after lime is added?
27. Why are watering and mixing operations started immediately after spreading quicklime?
- a) To minimize the loss of lime due to wind
 - b) To minimize the risk of lime burns
 - c) To ensure a uniform rate of stabilization
 - d) To avoid carbonation of lime in the exposed surface
28. What is the maximum percent of lime solids for pumpable slurry?
- a) 20 percent
 - b) 31 percent
 - c) 40 percent
 - d) 49 percent
29. Which type of lime has the advantage of faster drying action in wet soils?
- a) Dry hydrated lime
 - b) Dry quicklime
 - c) Slurry made with hydrated lime
 - d) Slurry made with quicklime
30. To be conducive to curing, moisture contents should be around optimum and temperatures should be higher than what?
- a) 40 to 50 degrees F
 - b) Less than 40 degrees F
 - c) Greater than 60 degrees F
 - d) 50 to 60 degrees F

4-3 Construction with LF and LCF

31. Which mixing procedure is recommended for LF and LCF?
- a) Two-stage mixing
 - b) Blade mixing
 - c) Central plant mixing
 - d) Windrow-type pugmill mixing

4-4 Construction with Bitumen

32. Which of the following is not a mixer used in bituminous stabilization?
- a) Hopper-type pugmill
 - b) Asphalt distributor
 - c) Motor grader
 - d) Rotary mixer
33. Care must be taken to see that mixing is not attempted at aggregate temperatures below what?
- a) 20 degrees F
 - b) 30 degrees F
 - c) 40 degrees F
 - d) 50 degrees F
34. When rotary mixing, asphalt should be added at what increments?
- a) Not less than 0.40 gallons per square yard
 - b) About 0.50 gallons per square yard
 - c) 0.4 to 0.7 gallons per square yard
 - d) Not exceeding 0.75 gallons per square yard
35. Which of the following statements is true?
- a) Fine-grained and well-graded mixtures will require shorter aeration
 - b) Coarse-grained and open-graded mixtures will require longer aeration
 - c) Fine-grained and well-graded mixtures will require longer aeration
 - d) Fine-grained and well-graded mixtures will require the same aeration as coarse-grained and open-graded mixtures
36. When using cut-back asphalt, correct aeration will be achieved when volatile content is reduced to what percentage of that contained in the original asphaltic material?
- a) About 50 percent
 - b) About 40 percent
 - c) About 35 percent
 - d) About 30 percent

37. The type of haul truck to be used with cold mix produced in stationary plants depends on what?

- a) The amount of material to be hauled
- b) The spreading equipment to be used
- c) The distance from the job site
- d) The type of material to be hauled

CHAPTER 5 – QUALITY CONTROL

38. With cement-stabilization, the equipment used for compaction is dependent upon what?

- a) Soil type
- b) Percent of compaction required
- c) Water content
- d) Depth

39. The National Lime Association recommends an absolute maximum delay of how long between mixing and compacting of lime-stabilized soil?

- a) 48 hours
- b) 3 days
- c) One week
- d) 10 days

40. The Asphalt Institute recommends a curing period of how long for bituminous-stabilized soils?

- a) 2 days maximum
- b) 2 to 5 days
- c) 5 to 7 days
- d) 7 days minimum



Answer Sheet for Soil Stabilization for Pavements
 TPDH-00014

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