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Examination for Evaluation and Repair of Concrete Structures Part 2
Chapters 3 and 4 only

CHAPTER 3 – CAUSES OF DISTRESS AND DETERIORATION OF CONCRETE

1. Laboratory tests are usually necessary to confirm accidental loading damage?
   a) True
   b) False
   c) Not enough information for a specific answer
   d) Too many variables for a specific answer

2. What can be used to identify the specific acid involved in concrete deterioration?
   a) Laboratory analysis
   b) A field test kit
   c) Visual inspection
   d) Petrographic examination

3. What may be used confirm the presence of alkali-carbonate rock reactions?
   a) Laboratory analysis
   b) A field test kit
   c) Visual inspection
   d) Petrographic examination

4. What two concrete types are recommended for protection against sulfate attack?
   a) Type V and Type III
   b) Type IV and Type II
   c) Type V and Type II
   d) Type IV and Type III

5. A peak particle velocity of ground vibrations measuring 104 mm/sec is acceptable at what age of the concrete at the time of vibration?
   a) Up to 3 hours
   b) 11 to 24 hours
   c) 24 to 48 hours
   d) Over 48 hours

6. Laboratory analysis is not applicable in cases of suspected inadequate design?
   a) True
   b) False
   c) Not enough information for a specific answer
   d) Too many variables for a specific answer

7. What is one of the most frequent causes of cracking of slabs-on-grade?
   a) Corrosion of reinforcing steel
   b) Inadequate contraction joint spacing
   c) Inadequate provisions for drainage
   d) Inadequately designed expansion joints

8. What may be required to identify potential causes of erosion damage and to evaluate the effectiveness of various design modifications?
   a) Structural design review
   b) Hydraulic model studies
   c) Acoustic mapping
   d) Hydraulic design review

9. Cavitation damage may occur where there is surface irregularity and when water flow is what?
   a) Less than 2.2 m/sec
   b) 2.2 to 10.2 m/sec
   c) Greater than 12.2 m/sec
   d) 10.2 to 12.2 m/sec

10. The underlying cause of subsidence and differential movement is likely to be what?
   a) Failure of the foundation material
   b) Freezing and thawing of base material
   c) New or additional loading conditions
   d) The movement of nonstructural elements

11. Bleeding is caused by what?
   a) Evaporation of surface water
   b) The appearance of moisture on the surface of concrete
   c) The settling of heavier components of a concrete mixture
   d) Shrinkage of concrete during curing

12. What is the best way to prevent damage caused by temperature changes?
   a) Provide adequate curing
   b) Reduce the amount of restraint on the concrete
   c) The use of reinforcing steel
   d) The use of contraction and expansion joints

13. What are the only two symptoms listed for accidental loading?
    a) Cracking and disintegration
    b) Spalling and cracking
    c) Disintegration and erosion
    d) Cracking and distortion/movement

CHAPTER 4 – PLANNING AND DESIGN OF CONCRETE REPAIR

14. Repair materials should have a compressive strength similar to that of the existing concrete substrate?
    a) True
    b) False
    c) Not enough information for a specific answer
    d) Too many variables for a specific answer

15. What is the coefficient of expansion for polymer-aggregate combinations compared to concrete?
    a) 6 to 14 times
    b) 1.5 to 5 times
    c) 1.0 to 1.5 times
    d) 5 to 6 times

16. When using a polymer adhesive, what is the expected improvement in bond?
    a) Greater than 30 percent
    b) 25 to 30 percent
    c) Less than 25 percent
    d) Less than 20 percent

17. What is proposed maximum shrinkage for repair materials at 28 days?
    a) 0.03 percent
    b) 0.05 percent
    c) 0.04 percent
    d) 0.06 percent

18. What type of material should be used if a repair will be subject to heavy vehicular traffic?
    a) A high-strength material
    b) A polymer-based material
    c) A rapid-hardening material
    d) A latex-emulsion material

19. Which of the following properties may not be provided in material data sheets?
    a) Tensile strength
    b) Modulus of elasticity
    c) Slant-shear bond
    d) Drying shrinkage

20. At the time of this publication, what percentage of available repair materials have been evaluated for the Repair Materials Database?

a) Less than 20 percent
b) Less than 25 percent
c) Greater than 25 percent
d) Greater than 30 percent

21. Repair of cracking caused by severe alkali-aggregate reaction may not be feasible?

a) True
b) False
c) Not enough information for a specific answer
d) Too many variables for a specific answer

22. What should the repair method be for an isolated dormant crack in which the water condition is severe and no strengthening is required?

a) Additional reinforcement
b) Epoxy injection
c) Flexible sealing
d) Grouting

23. What is the repair approach for corrosion that is likely to continue?

a) Partial replacement
b) Surface coatings
c) No action
d) Total replacement

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Answer Sheet for Evaluation and Repair of Concrete Structures Part 2
TPDH-00021

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Please completely fill in one box for each answer

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I hereby certify that I have studied the course materials, and the above answers are my own. No other person has helped me complete this examination.

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