Mechanically Stabilized Earth Structures - Part 2
Test Worksheet

1. What are the main failure modes for MSE walls?
   a. external
   b. internal
   c. global
   d. all of the above

2. Global stability must address which of the following slip surfaces?
   a. internal
   b. compound internal
   c. deep seated
   d. all of the above

3. What are the external failure modes for MSE walls?
   a. sliding
   b. overturning
   c. bearing capacity
   d. all of the above

4. What are the internal failure modes for MSE walls?
   a. sliding
   b. tensile overstress
   c. pullout
   d. all of the above

5. Unless otherwise specified by jurisdiction or criticality of the wall the minimum factor of safety for global stability is ______?  
   a. 1.30
   b. 1.50
   c. 2.00
   d. none of the above

6. An external sliding failure can occur when ______.
   a. no embedment is used
   b. the base reinforcement length lowest reinforcement layer is not long enough to withstand external forces
   c. low strength geogrid is used
   d. reinforced zone is constructed using fine grained soils

7. What is the main purpose for calculating external stability due to overturning?
   a. overturning controls the design reinforcement length
   b. to check for shear failure of foundation soils
   c. to determine eccentricity values used in bearing capacity analyses
   d. none of the above

8. What is the footing width below the MSE wall system?
   a. Width of the leveling pad below the block units
   b. The footing width is measured from the face of the block to the back of the reinforced earth zone, i.e. the base geogrid length L.
   c. Equal to 50% of the total wall height
   d. none of the above

9. At what angle is the internal failure plane defined for a MSE wall?
   a. 45-degrees
   b. 45-\(\Phi/2\)
   c. 45+\(\Phi/2\)
   d. all of the above

10. Internal pullout typically controls the reinforcement length for the______.
    a. top two or three layers
    b. bottom of wall
    c. both A and B
    d. none of the above

11. In most cases the coefficient of interaction value \(C_i\) will range between.
    a. 0.75 to 0.90
    b. 0.50 to 0.60
    c. 0.90 to 0.95
    d. 1.05 to 1.10

12. Tensile overstress is a common mode of failure observed in the field.
   a. False
   b. True

13. Internal sliding typically controls the reinforcement length for the______.
    a. top two or three layers
    b. bottom reinforcement layer
    c. both A and B
    d. none of the above

14. The coefficient of direct sliding \(C_{ds}\) is never greater than 1.0.
    a. True
    b. False

15. Bulging of the facing units can be a sign of______.
    a. poor facing unit installation
    b. large vertical spacing
    c. poor compaction
    d. all of the above

16. Is a global stability analysis required for all MSE wall designs?
    a. yes - only for walls <20-ft
    b. yes - for every MSE wall
    c. yes - only if slopes are present above or below the wall
    d. yes - only if buildings are present above the wall

17. A global stability analysis takes into______account.
    a. MSE wall geometry
    b. soil and groundwater
    c. external loading and seismicity
    d. all of the above

18. What are the global stability failure modes that need to be addressed for MSE walls?
    a. deep seated addressing slip surfaces below and behind the MSE wall
    b. internal slip surfaces passing through the MSE wall
    c. compound internal slip surfaces passing through and behind the MSE wall
    d. all of the above
19. Who is responsible for conducting internal and compound internal global stability analyses?
a. civil engineer  
b. geotechnical engineer  
c. MSE wall engineer  
d. hydraulic engineer

20. Who is responsible for conducting a deep seated global stability analysis for MSE walls?
a. civil engineer who set the site grades  
b. geotechnical engineer as they are the most qualified team member with knowledge of the subsurface conditions at the wall location.  
c. MSE wall engineer  
d. B or C…but someone has to conduct the global stability analysis.

21. What is a common mistake made by inexperienced wall engineers regarding tiered walls?
a. they only perform an external stability analysis  
b. they make the tiered wall system greater than 20-ft in height  
c. they design each tier as a separate wall, rather than considering the influence of upper tier on the lower tier  
d. all of the above

22. A MSE wall design should include?
a. geotechnical recommendations  
b. wall profile, wall section details, specifications and calculations  
c. surface water calculations  
d. all of the above

23. MSE wall specifications should include?
a. testing requirements for fill soil and compaction  
b. provisions for drainage, utilities and surcharge loads  
c. slopes above/below the wall and any penetrations through the wall  
d. all of the above

24. Engineers who design MSE walls must have a background in _____ engineering.
a. civil  
b. structural  
c. geotechnical  
d. environmental

25. Contractors who build MSE walls ≥ 6-ft tall should have constructed a minimum ______ sf of wall.
a. 50,000-ft²  
b. 150,000-ft²  
c. 250,000-ft²  
d. 500,000-ft²

26. Low spots along the wall alignment ______:  
a. are not aesthetically pleasing  
b. collect water and creates a situation in which washout or wall failure can occur  
c. are not a problem  
d. none of the above

27. If a 2H:1V, 2.5H:1V or 3H:1V toe slope is to be constructed or exists, a "5-foot wide level bench" should be graded immediately in front of the MSE wall or slope.
a. True  
b. False

28. When developing the grading plan the civil engineer should:  
a. add swales to walls with crest slopes greater than 5-feet in height  
b. remove low spots from walls  
c. provide scour protection  
d. all of the above

29. At parking lots the civil engineer should drain water away from wall.
a. True  
b. False

30. Which underground utilities should be located outside the reinforced zone if possible?
a. storm and sewer pipes  
b. curb inlets and manholes  
c. electrical/cable conduits  
d. all of the above

31. What are the primary reasons attributed to MSE wall failures?
a. poor design/construction  
b. inadequate compaction  
c. drainage  
d. B and C

32. What should the maximum compacted lift thickness be for MSE wall construction?
a. 24-inches  
b. 12-inches  
c. 8-inches  
d. 4-inches

33. The statement regarding geotechnical software “garbage in = gospel out”, was made by whom?
a. Henri Vidal  
b. Bill Kovacs  
c. J.P. Giroud  
d. Dov Leshchinsky

34. What are the two lessons for design engineers as noted by J.P. Giroud?
a. If a design engineer predicts a failure using a rational method, the failure is likely to occur and, therefore, the design engineer should believe the prediction.  
b. A design engineer should never take a risk such that, if a failure occurs, it can be explained by an expert using rational methods.  
c. If a wall is designed using a well known method such as NCMA or FHWA the chance of failure very limited.  
d. A and B

35. Who should be in control of the MSE wall design process?
a. engineering community  
b. design build wall contractor  
c. material suppliers  
d. all of the above