



## Course Instructions

**NOTE:** The following pages contain a preview of the final exam. This final exam is identical to the final exam that you will take online after you purchase the course.

After you purchase the course online, you will be taken to a receipt page online which will have the following link: [Click Here to Take Online Exam](#). You will then click on this link to take the final exam.

### 3 Easy Steps to Complete the Course:

- 1.) Read the Course PDF – download from our website
- 2.) Purchase the Course Online & Take the Final Exam – see note above
- 3.) Print Out Your Certificate

**Structural Deformation Surveying**  
**Quiz Questions**  
**January 21, 2014**

- 1. The primary emphasis of this manual is placed on the technical procedures for performing precise monitoring surveys in support of the Corps periodic inspection and dam safety programs.**
  - a. True
  - b. False
  
- 2. Considering Deformation Survey Techniques, the general procedures to monitor the deformation of a structure and its foundation involve measuring the \_\_\_\_\_ of selected object points (i.e., target points) from external reference points that are fixed in position:**
  - a. vertical movement.
  - b. lateral shifting.
  - c. horizontal distance.
  - d. spatial displacement.
  
- 3. According to Table 2-1, the accuracy requirement for vertical stability/settlement of a concrete structure is:**
  - a.  $\pm 10$  mm.
  - b.  $\pm 5 - 10$  mm.
  - c.  $\pm 2$  mm.
  - d.  $\pm 20$  mm.
  
- 4. Which of the following is NOT an actual Professional Association involved in deformation studies?**
  - a. International Association of Geodesy.
  - b. National Association of Concrete Flexing.
  - c. International Society for Rock Mechanics.
  - d. International Society for Mine Surveying.
  
- 5. With regards to Foundation Problems in Dams, differential settlement, sliding, high piezometric pressures and \_\_\_\_\_ are common evidences of foundation distress:**
  - a. uncontrolled seepage.
  - b. frost heaving.
  - c. efflorescence.
  - d. hairline cracking.
  
- 6. According to Section 2-7, monitoring is not required to assess the safety performance of lock structures.**
  - a. True
  - b. False

**7. Considering Deformation Measurement and Alignment Instrumentation, the measuring techniques and instrumentation for deformation monitoring have traditionally been categorized into \_\_\_\_\_ groups according to the disciplines of professionals who use the techniques:**

- a. seven.
- b. three.
- c. four.
- d. two.

**8. Differential Leveling provides height difference measurements between a series of benchmarks.**

- a. True
- b. False

**9. All measurements with optical theodolites are subject to Optical Pointing Error due to such factors as: target design, prevailing atmospheric conditions, \_\_\_\_\_, and focusing:**

- a. operator bias.
- b. shoddy equipment.
- c. fluctuating magnetic fields.
- d. solar flares.

**10. Figure 5-5 depicts a typical field EDM recording form used at \_\_\_\_\_:**

- a. Hoover Dam.
- b. Grand Haven Lock and Dam.
- c. Columbia Dam.
- d. Inglis Lock.

**11. Section 6-1 covers standards and specifications for performing precise differential leveling surveys, as required to monitor settlements in concrete and embankment structures.**

- a. True
- b. False

**12. Regarding Total Station Trigonometric Heights, EDM/Total Station trigonometric heighting can be used to determine \_\_\_\_\_ in lieu of spirit leveling:**

- a. settlement.
- b. lateral movement.
- c. fissure shifts.
- d. height differences.

**13. Chapter 7 describes EDM/Total Station methods for accurately measuring small relative deflections or absolute deformations in hydraulic structures.**

- a. True
- b. False

- 14. Figure 7-1 depicts:**
- alignment micrometer measurements.
  - EDM/Total Station methods.
  - a traditional transit.
  - Port Mayaca Spillway.
- 15. Considering Section 7-4, the micrometer observation and calibration procedures outlined in this chapter are considered \_\_\_\_\_:**
- optional.
  - mandatory.
  - as recommendations.
  - obsolete.
- 16. With regards to Section 8-5, Surveying Procedures, the objective of deformation surveys is to determine the position of object points on the monitored structure.**
- True
  - False
- 17. With respect to GPS Survey Reporting and Results, GPS monitoring surveys produce \_\_\_\_\_ data and processing outputs:**
- very little.
  - large amounts of.
  - occasional.
  - partial.
- 18. For Closure and Station Checks, loop misclosures are computed by comparing at least \_\_\_\_\_ interconnected baselines:**
- four.
  - three.
  - two.
  - five.
- 19. Concerning Least Squares Adjustment, the Least Squares principle is \_\_\_\_\_ applied to the adjustment of surveying measurements because it defines a consistent set of mathematical and statistical procedures for finding unknown coordinates using redundant observations.**
- seldom.
  - widely.
  - never.
  - always.
- 20. From Table 9-1, the minimum constraint for Network Type 1D is:**
- z of 1 point held fixed.
  - x and y of 2 points held fixed.
  - x, y, z of 3 points held fixed.
  - x and y of 4 points held fixed.

- 21. Table 9-2 reflects Rejection Criteria for Preprocessing of Deformation Survey Data.**
- True
  - False
- 22. Figure 9-11 illustrates:**
- adjustment network plots.
  - ratio of two lines.
  - adjustment histograms.
  - network maps.
- 23. Considering Relative Distance Ratio Assessment Methods, certain EDM biases such as refraction and scale error in EDM distance measurements can be minimized between two survey epochs, without calculating corrections, by application of "reference line ratio" methods.**
- True
  - False
- 24. Figure 10-2 illustrates:**
- adjustment network plots.
  - ratio of two lines.
  - ratios in a triangle.
  - network maps.
- 25. The Elevation for Example Deformation Survey from Table 10-2 for point A1 is:**
- 329.339.
  - 512.799.
  - 281.005.
  - 410.724.
- 26. When considering the Analysis and Assessment of Results, even the most precise monitoring surveys will not fully serve their purpose if they are not properly evaluated and utilized in a global integrated analysis.**
- True
  - False
- 27. With regards to Statistical Modeling (11-3), the statistical method establishes an empirical model of the load-deformation relationship through regression analysis, which determines the correlations between observed deformations and observed loads (external and internal causes producing the deformation).**
- True
  - False

- 28. The Hybrid Analysis Method (11-5) is \_\_\_\_\_ at the early stage of dam operation when only short sets of observation data are available:**
- a. not suitable.
  - b. preferred.
  - c. required.
  - d. optional.
- 29. For the Report Format (12-1), contained in the final Survey Report are the \_\_\_\_\_, supporting analysis, results, and a report of conclusions:**
- a. invoice.
  - b. field notes.
  - c. contract.
  - d. description of interferences, if any.
- 30. Considering Data Management (12-3), the organization and management of historical movement data is not critical because the structure is usually replaced every 20 to 25 years.**
- a. True
  - b. False