

Highway Engineering I

1. Why has the FHWA adopted Interstate Highway design standards?

- To promote vehicle safety.
- To provide uniform minimum standards for protection against lawsuits.
- So drivers aren't confused by a variety of conflicting roadside conditions.
- All of the above.

2. What common handbook and standards does the FHWA rely upon?

- Southern Building Code as adopted by the NHS.
- International guidelines found in ISO-9000.
- Documents produced by AASHTO and State D.O.T.'s.
- NTSB documents for vehicle collision investigation.

3. Sovereign Immunity applies under which circumstances?

- When there are no design standards on record or otherwise available.
- When formal design standards have been adopted by a governmental agency.
- In the case of a foreign lawsuit against a private party.
- When an attorney sues another attorney.
- When a county public works department is investigated by the State Attorney.

4. What Federal Statute authorizes the National Highway System to be under FHWA jurisdiction?

- The National Highway Act of 1946.
- Federal Statute of 1951 titled "U.S. Highways, 20 year plan."
- Federal Statute 23 USC 109.
- FHWA Administrative Code 43-E202 referencing AASHTO's "Green Book."

5. The AASHTO "Green Book" is used by what agencies as a design standard?

- Department of the Army.
- Department of the Navy.
- U.S. Department of Commerce.

d. U.S. State Department for foreign construction.

e. State Transportation Departments and FHWA.

6. A link to all State Transportation Departments' Design Manuals can be found at which web location?

- FHWA Program Administration page.
- FHWA Administrative Code Statutory Reference.
- U.S. Commerce Department Transportation Guidelines site.
- U.S. Military Base Construction (domestic) Handbook website.

7. What is the Florida D.O.T. "Green Book" ?

- This manual describes landscape planting and maintenance.
- A handbook which is a direct copy of the AASHTO "Green Book."
- Minimum uniform standards for all roads and streets in Florida.
- Was adopted from Georgia D.O.T. for rural road construction.

8. Does the Florida D.O.T. distribute their design standards free of charge by internet download?

- No. They can only be purchased from the Tallahassee bookstore.
- They are available for purchase from Barnes and Noble.
- Yes, they are free downloads from the Florida D.O.T. web site.
- They are available as a free subscription from the FDOT Tallahassee main office.

9. What is the primary design consideration to work out before commencing a roadway project for a governmental agency?

- Determine in writing who will be the contracting officer for construction.
- Determine in writing who will sign the design disbursement checks.
- Agree in writing on all design standards and criteria to be used.

d. Contact the State Maintenance Engineer and request landscape specifications.

10. Does the Department of Defense have a flexible pavement design guide?

- No, the DoD uses only concrete pavement over crushed rock.
- UFC 3-250-01FA is their current manual/handbook (free download).
- The State Department adopts the pavement design from the country in which the facility is being constructed.
- The Secretary of Defense assigns a pre-approved design from prior projects.

11. What is the "CBR," and what is it used for?

- CBR is concrete bridge rating, a type of load measurement.
- This acronym refers to cement-bituminous ratio, used to design asphalt pavement mixes.
- CBR is "California Bearing Ratio" and it refers to subgrade strength, to distinguish between firm subgrade and softer materials.
- CBR is the rating given to businesses by the Commerce Department.

12. Frost action on a pavement subgrade generally produces what effect?

- Non-uniform heave of the pavement surface.
- Ice lenses which tend to explode under heavy loading conditions.
- A checkerboard pattern of pavement cracking.
- Semi-regular lateral cracking with an approximate 10 ft. spacing.

13. RCC Pavement refers to what type of material?

- Re-used concrete chips.
- Roller-compacted concrete.
- Radially-controlled concrete pavement equipment for bridge decks.
- Recycled cement from crushed concrete plants.

14. From NAVFAC document P-1015, who has responsibility for daily inspection?

- The Principal Government Representative.
- The Government Contracting Officer.
- The Inspector General's Office.
- The inspection contractor.

15. Using the 2007 Florida "Green Book," where are the minimum clear recovery area or "clear zone" requirements located?

- In Chapter 4, "Roadside Design."
- Chapter 3, "Geometric Design," describes the subject conditions.
- In Chapter 11, "Work Zone Safety."
- Clear Zone requirements are not specified. They must be obtained from the FDOT "Design Standards" handbook.

16. Referring to NCHRP Report 537, which agency comments on the use of curbs on high-speed roadways?

- FHWA
- FHA
- AASHTO
- National Transportation Safety Board
- ASTM
- National Council on Vehicle Impact Testing

17. Referring to NCHRP Report 537, how were vehicle impacts with curbs investigated?

- By using computer simulation and full-scale crash tests.
- Computer simulation and statistical review of crash data only.
- By filming actual vehicle crashes, with statistical review.
- Use of aerial photography to determine hazard areas and statistics.

18. Referring to NCHRP Report 537, what was the recommendation from NCHRP Project 22-17 ?

- Curb cannot be used on a high-speed facility.

- b. Guardrail and guardrail combinations are useful only at bridge approaches.
- c. Guidelines for use of curbs and curb-barrier combinations on highways with design speeds in excess of 40 mph.
- d. Further research is required to determine applicability of curb and guardrail combinations.

19. From the Florida “Green Book,” which types of facilities are assumed to be used by pedestrians?

- a. Interstate highway facilities.
- b. Limited-access highways.
- c. Bicycle lanes.
- d. All highways except limited access highways.

20. From the Florida “Green Book,” which design exceptions require approval from the maintaining authority?

- a. Only those design exceptions involving the National Highway System.
- b. All design exceptions, including public or private utilities.
- c. Design exceptions which involve a State or Federal Facility.
- d. Design exceptions do not require approval from the maintaining authority.

21. From the Florida “Green Book,” what four issues should be addressed and documented in a request for design exception?

- a. Description, operational impacts, safety impacts, and B/C analysis.
- b. Benefit / Cost analysis, FHWA Standards, AASHTO, and State references.
- c. Safety and operational impacts, cost reduction, and “Green Book” standards.
- d. Cost reduction to the user agency with safety impact, time, and schedule.

22. What chapter in the Florida “Green Book” refers to a design exception letter?

- a. Chapter 22
- b. Chapter 5
- c. Chapter 14
- d. Chapter 12

23. From the Florida “Green Book,” where is it inappropriate to install neighborhood traffic calming measures?

- a. Along collector roads.
- b. Along neighborhood streets.
- c. Along arterial roads and truck routes.
- d. Along truck routes and neighborhood streets.

24. From the Florida “Green Book,” what are inappropriate traffic calming treatments?

- a. Graded drainage ditches alongside the roadway.
- b. Stop signs, speed bumps, and coarse gravel surface treatments, 1/4 inch dia.
- c. Speed warning signs with a bright orange background.
- d. Stop signs, speed bumps, novelty signs, odd speed limit signs, & rumble strips.

25. Why should the “centerline of construction” be tied to the right-of-way on a highway construction plan set?

- a. So the construction is not left floating within the right-of-way.
- b. In order to increase the available land used for the facility.
- c. So the construction contractor’s layout crew can complete the design as needed.
- d. This allows the adjacent land owners to provide driveway access.

26. In Florida, can the record drainage engineer seal all the sheets of the final highway construction plan set?

- a. This engineer can only sign and seal the sheets which were prepared under his direct control and supervision.
- b. The drainage engineer acts as engineer-of-record for all highway plan sheets.
- c. The “chief engineer” for the firm who prepares the construction drawings signs and seals all the plan sheets as chief engineer.
- d. The drainage engineer signs and seals the roadway and drainage plan sheets.

27. Guardrail can be used at which locations?

a. At any location where an obstacle requires protection from vehicles.

- b. At all power pole locations which lie within the clear recovery area.
- c. Where a careful evaluation of alternatives indicates its use is appropriate.
- d. Only at locations which are within 3.25 ft. of the travel lane.

28. What situations are appropriate to allow a substitution of curb for guardrail?

- a. Along major highways with design speed less than 50 mph.
- b. This is never an appropriate situation.
- c. When the AASHTO “Green Book” allows it for residential streets.
- d. According to FHWA Administrative Code.

29. Why are break-away signs used?

- a. So pedestrians using state highways are not injured by flying glass.
- b. In accordance with AASHTO, these signs are used in urban areas to protect private property.
- c. They are used at pedestrian signals at urban intersections to prevent injury.
- d. They are primarily used to prevent injury on high speed highways.

30. What responsibility does a utility have regarding a fire hydrant located within the clear recovery area of a roadway?

- a. Upon notification, it has the responsibility to remove the offending hydrant.
- b. It should notify the County Engineer in writing of the problem.
- c. The utility company should add this hydrant to its list of remedial projects.
- d. The utility agency/owner has no responsibility to do anything.

31. On a highway design project, underground utility relocations are designed by?

- a. The drainage engineer of record.

b. The “chief engineer” for the firm providing the construction management.

- c. The highway design engineer or utility design engineer of the firm producing the construction plans, in coordination with the utility companies.
- d. The utility companies provide the final signed/sealed plans.

32. What is the procedure for using an inapplicable design standard on a highway design project?

- a. Apply to the State Highway Engineer for a waiver of standards.
- b. Ask the person requesting the inapplicable standard to make a written request.
- c. Use the applicable AASHTO “Green Book” form to apply for a waiver.
- d. Use of inappropriate design standards is never an allowable design practice

33. The Federal Highway Administrator has responsibility to approve what?

- a. NHS design standards.
- b. Appropriate funding for the Interstate Highway System.
- c. Waivers of design standards for rural roads.
- d. Applicable information for the analysis of cost/benefit ratios for highways.

34. Military facilities which are within a state having Interstate Highway facilities must use which set of standards for design?

- a. FHWA design standards.
- b. NAVFAC standards applicable to that type of facility.
- c. The design standards agreed upon with the contracting officer and the design firm producing the construction plans.
- d. Department of Defense standards from the WBDG web site.