

Guide to Passing the Construction PE Exam

Edition 2

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TOPICS

| <u>Topic</u> | <u>Page</u> |
|---|-------------|
| <u>TOPIC I:</u> Earthwork Construction and Layout | 1-46 |
| <u>TOPIC II:</u> Estimating Quantities and Costs | 47-102 |
| <u>TOPIC III:</u> Construction Operations and Methods | 103-184 |
| <u>TOPIC IV:</u> Scheduling | 185-223 |
| <u>TOPIC V:</u> Material Quality Control and Production | 224-265 |
| <u>TOPIC VI:</u> Temporary Structures | 266-335 |
| <u>TOPIC VII:</u> Health and Safety | 336-363 |

TABLE OF CONTENTS

| | |
|---|------|
| How to Use This Guidebook..... | viii |
| Schedule for Self-Study | ix |
| The 9 Construction Design Standards | xi |
| Practice Problem Books..... | xii |

TOPIC I: Earthwork Construction and Layout

| | |
|--|-------|
| 1. Excavation and Embankment..... | 3-12 |
| 2. Borrow Pit Volumes..... | 13-22 |
| 3. Site Layout and Control | 23-28 |
| 4. Earthwork Mass Diagrams and haul distance | 29-37 |
| 5. Site and subsurface investigations..... | 38-46 |

TOPIC II: Estimating Quantities and Costs

| | |
|---|--------|
| 6. Quantity Take Off Methods | 49-65 |
| 7. Cost Estimating | 66-74 |
| 8. Cost analysis for resource selection | 75-97 |
| 9. Work measurement and productivity | 98-102 |

TOPIC III: Construction Operations and Methods

| | |
|---|---------|
| 10. Lifting and Rigging | 106-120 |
| 11. Crane Stability..... | 121-127 |
| 12. Dewatering and Pumping | 128-139 |
| 13. Equipment Operations (e.g. selection, production, economics) | 140-172 |
| 14. Deep foundation installation | 173-184 |

TOPIC IV: Scheduling

| | | |
|-----|--|---------|
| 15. | Construction Sequencing..... | 187-194 |
| 16. | Activity Time Analysis | 195-198 |
| 17. | Critical path Method (CPM) Network Analysis..... | 199-209 |
| 18. | Resource Scheduling and leveling | 210-215 |
| 19. | Time-Cost Trade-Off..... | 216-223 |

TOPIC V: Material Quality Control and Production

| | | |
|-----|--|---------|
| 20. | Material Properties and Testing | 225-229 |
| 21. | Weld and Bolt Testing Installation..... | 230-239 |
| 22. | Quality Control Process (QA/QC) | 240-246 |
| 23. | Concrete proportioning and placement | 247-259 |
| 24. | Concrete Maturity and Early Strength Evaluation | 260-265 |

TOPIC VI: Temporary Structures

| | | |
|-----|---|---------|
| 25. | Construction Loads, codes, and standard | 268-276 |
| 26. | Formwork..... | 277-295 |
| 27. | Falsework and Scaffolding..... | 296-303 |
| 28. | Shoring and Reshoring | 304-309 |
| 29. | Bracing and Anchorage for stability | 310-326 |
| 30. | Temporary support of excavation..... | 327-335 |

TOPIC VII: Health and Safety

| | | |
|-----|--|---------|
| 31. | OSHA Reg and hazard identification/abatement | 338-340 |
| 32. | Safety Management and statistics | 341-345 |
| 33. | Work zone and public safety | 346-363 |

***READ FIRST: How to Use This Guidebook**

This Construction PE Exam guide is intended to help walk you through studying for the Construction PM portion of the Civil PE exam. In this manual, you will find all of the study material needed for the construction portion of the exam. We have spent countless hours reviewing material from the Civil Engineering Reference Manual (CERM), the NCEES design standards, study guides, the internet, and other engineering manuals to ensure that we have provided you with the most up-to-date and accurate resource available.

You are encouraged to study the other AM modules before you begin to study this book and prepare for the construction AM and PM. However, the majority of your study time should be on construction related topics. With the new 2015 there are at least 51 questions or 64% of the exam is from the material within this book. If you get 85% on the construction material and just get 50% of the questions right on each of the other sections, you will still pass the PE exam. You should definitely still study for the other parts of the exam. However, you can see why studying for your depth is the most important. Use the self-study schedule to plan out how you are going to study. Over 50% of your time should be dedicated to construction engineering.

When you begin studying from the book use the following approach:

1. Buy all required design standard first thing.
2. Print out e-book and place in 3” binder. Tab each chapter.
3. Go to and sign up for my newsletter and print off the construction engineering cheat sheet and put it in the front part of the book. Add to it as needed.
4. Read through one chapter at a time. As you read through and notice references to design standard sections make sure to tab those sections. **The last page of each section there is a space for you to write in reference you use and problems from other books.** Fill this in as you go. It will come in handy during the test.
5. Once you complete each chapter, solve as many problems as you can that relate to the chapter you just covered. Do at least three problems from other sources. If you have any questions on a technique or a concept, ask the questions at either www.learncivilengineering.com or www.engineerboards.com.
6. Place those problems inside the construction binder behind the example problems given in the book make a tab labeled “Problems” for each section too.

If you follow this approach, you will have solved multiple problems for every section and you will have all your design standards, notes pages, and problems fully tabbed so that you can easily reference them during the actual exam. Organization is a key for the exam!

Schedule for Self Study

| Subject | Start Date | Finish Date | Comments |
|---|------------|-------------|----------|
| Soil Mechanics (Geotechnical) | | | |
| Lateral Earth Pressure | | | |
| Soil Consolidation | | | |
| Effective and total Stresses | | | |
| Bearing Capacity | | | |
| Foundation settlement | | | |
| Slope stability | | | |
| Geometrics (Transportation) | | | |
| Basic Circular curve elements | | | |
| Basic Vertical curve elements | | | |
| Traffic volume (e.g., vehicle mix, flow, and speed) | | | |
| Hydraulics and Hydrology (Water Resources) | | | |
| Open Channel flow | | | |
| Stormwater collection and drainage | | | |
| Storm characteristics | | | |
| Runoff Analysis | | | |
| Detention/retention ponds | | | |
| Pressure conduit | | | |
| Energy and/or continuity equation | | | |

Schedule for Self Study - cont

| Subject | Start Date | Finish Date | Comments |
|--|------------|-------------|----------|
| Structural Mechanics (Structural) | | | |
| Dead and live loads | | | |
| Trusses | | | |
| Bending (e.g., moments and stresses) | | | |
| Shear (e.g., forces and stresses) | | | |
| Axial (e.g., forces and stresses) | | | |
| Combined stresses | | | |
| Deflection | | | |
| Beams | | | |
| Columns | | | |
| Slabs | | | |
| Footings | | | |
| Retaining Walls | | | |
| Materials (Geo/Str) | | | |
| Soil classification and boring log interpretation | | | |
| Soil properties (e.g., strength, permeability, compressibility, phase relationships) | | | |
| Concrete (nonreinforced, reinforced) | | | |
| Structural steel | | | |
| Material test methods and specification conformance | | | |
| Compaction | | | |

Schedule for Self Study - cont

| Subject | Start Date | Finish Date | Comments |
|---|------------|-------------|----------|
| Project Planning (Construction) | | | |
| * Quantity Take-off methods | | | |
| * Cost estimating | | | |
| * Project Schedules | | | |
| * Activity identification and sequencing | | | |
| Means and Methods (Construction) | | | |
| * Construction loads | | | |
| * Construction methods | | | |
| * Temporary structures and facilities | | | |
| Site Development (Con, Water Resources, Trans) | | | |
| * Excavation and embankment | | | |
| * Construction site layout and control | | | |
| Temporary and permanent soil erosion and sediment control | | | |
| * Impact of construction on adjacent facilities | | | |
| * Safety (e.g., construction, roadside, work zone) | | | |

Schedule for Self Study - cont

| Subject | Start Date | Finish Date | Comments |
|---|------------|-------------|----------|
| Construction PM | | | |
| Earthwork Construction and Layout | | | |
| Estimating Quantities and Costs | | | |
| Construction Operations and Methods | | | |
| Scheduling | | | |
| Material Quality Control and Production | | | |
| Temporary Structures | | | |
| Health and Safety | | | |

*** Denotes that this material is also covered in the PM section of the Construction study guide.**

The 9 Construction Design Standards

The following are the design standards required for the Civil Engineering PE Exam - Construction Afternoon. These codes have been specified by NCEES effective April 2013 to use for the morning portion and the afternoon depth. NCEES will periodically update the codes that are needed for the exam, so make that sure before you purchase the following books, review the NCEES website to see if the standard have been updated at www.ncees.org/exams/pe-exam/.

* Important: These are the design standard that NCEES will use to test you, so any equations or information from these books are testable. It is highly recommended that you purchase these books early on when studying.

1. **ASCE 37-02 Design Loads on Structures During Construction**, 2002, American Society of Civil Engineers, Reston, VA, www.asce.org.
2. **NDS National Design Specification for Wood Construction**, 2012, American Forest & Paper Association/American Wood Council, Washington, DC, www.awc.org.
3. **CMWB Standard Practice for Bracing Masonry Walls Under Construction**, 2012, Council for Masonry Wall Bracing, Mason Contractors Association of America, Lombard, IL, www.masoncontractors.org.
4. **AISC Steel Construction Manual**, 14th ed., 2011 American Institute of Steel Construction, Inc., Chicago, IL, www.aisc.org.
5. **ACI 318-08 Building Code Requirements for Structural Concrete**, 2011, American Concrete Institute, Farmington Hills, MI, www.concrete.org.
6. **ACI 347-04 Guide to Formwork for Concrete**, 2004, American Concrete Institute, Farmington Hills, MI, www.concrete.org (in ACI SP-4, 7th edition appendix).
7. **ACI SP-4 Formwork for Concrete**, 7th ed., 2005, American Concrete Institute, Farmington Hills, MI, www.concrete.org.
8. **OSHA Occupational Safety and Health Standards for the Construction Industry**, 29 CFR Part 1926 (U.S. federal version), U.S. Department of Labor, Washington, D.C.
9. **MUTCD-Pt 6 Manual on Uniform Traffic Control Devices—Part 6 Temporary Traffic Control**, 2009, U.S. Federal Highway Administration, www.fhwa.dot.gov.

Practice Problems Books

Practicing problems is the most important thing you must do to pass the test. The reality is the more problems you solve the better your chances are of passing the test. Below are the recommended books that you should buy for the construction engineering PM exam.

1. **The Construction Depth Practice PE Exam** by Mark F. DeSantis, P.E. This eBook is available on the www.learncivilengineering.com website.
2. **PE Civil: Construction Sample Questions and Solutions** by NCEES, 2014. This is a must have book. A good AM exam and PM practice exam.
3. **Construction Depth Practice Exams for the Civil PE Exam**, Beth Lin Hartmann, P.E.

The above are the suggested buys. You should be prepared if you study this manual, solve the above problems, and review all the design standards. If you really think you need more material, check out the below.

4. **Civil PE Construction Module, Practice Problems**, second edition, 2013 by Ruwan Rajapakse. There are a lot of great problems and clearly explains solutions.
5. **Six-Minute Solutions for Civil PE Exam – Construction Problems**, Elaine Huang, P.E.