

Vertical Forces (Gravity/Other) and Incidental Lateral Component of the Structural Engineering DEPTH Section CBT Specifications

Effective Beginning April 2024

The **Vertical Forces (Gravity/Other) and Incidental Lateral** depth section focuses on a single area of practice in structural engineering. Examinees have 5.5 hours to complete this section, which contains 5 scenarios with 12 questions each, totaling 60 questions. The 5.5-hour time includes a tutorial and a scheduled break. The section will contain scored and unscored (pretest) questions. All questions are alternative item type (AIT) questions. Examinees must choose either the **BUILDINGS** or the **BRIDGES** section. Examinees must work the same section on both components. That is, if bridges is the section chosen in the Vertical Forces component, then bridges must be the section chosen in the Lateral Forces component.

The exam section is computer-based. It is closed book with electronic references. The NCEES *PE Structural Engineering Reference Handbook* is included in the exam along with the design standards shown on the last page.

BUILDINGS

The **Vertical Forces (Gravity/Other) and Incidental Lateral** Structural Engineering depth section in **BUILDINGS** covers loads, lateral earth pressures, analysis methods, general structural considerations (element design), structural systems integration (connections), and foundations and retaining structures.

This 5.5-hour section contains at least one scenario from each of the following types:

- Steel structure
- Concrete structure
- Wood structure
- Masonry structure

Knowledge areas may include:

- Conceptual design and project planning
- Structural loading and analysis
- Design and details of elements
- Design and details of joints and connections
- Preparation of documents and construction administration

BRIDGES

The **Vertical Forces (Gravity/Other) and Incidental Lateral** Structural Engineering depth section in **BRIDGES** covers gravity loads, superstructures, substructures, and lateral loads other than wind and seismic.

This 5.5-hour section contains at least one scenario from each of the following areas:

- Concrete superstructure
- Other elements of bridges (e.g., culverts, abutments, retaining walls)
- Steel superstructure

Knowledge areas may include:

- Conceptual design and project planning
- Structural loading and analysis
- Design and preparation of details

Notes:

1. All questions use the U.S. Customary System (USCS) of units.

STRUCTURAL ENGINEERING Design Standards

These standards apply to the Vertical and Lateral components of the Structural Engineering exam.

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In addition to the NCEES *PE Structural Engineering Reference Handbook*, the following codes and standards will be supplied in the exam as searchable, electronic pdf files with links for easy navigation. Standards will be provided as individual chapters on the exam, and only one chapter at a time can be opened and searched. This ensures the exam software runs large files effectively.

Solutions to exam questions that reference a standard of practice are scored based on this list and the revision year shown. Solutions based on other standards will not receive credit. All questions use the U.S. Customary System (USCS) of units.

NCEES does not sell design standards or printed copies of the NCEES handbook. The NCEES handbook is accessible from your [MyNCEES](#) account.

ABBREVIATION	DESIGN STANDARD TITLE
AASHTO	<i>AASHTO LRFD Bridge Design Specifications</i> , 8th edition, American Association of State Highway & Transportation Officials, Washington, DC.
IBC	<i>International Building Code</i> , 2018 edition, International Code Council, Falls Church, VA.
ASCE 7	<i>Minimum Design Loads and Associated Criteria for Buildings and Other Structures</i> , 2016 edition, American Society of Civil Engineers, Reston, VA.
ACI 318	<i>Building Code Requirements for Structural Concrete</i> , 2014 edition, American Concrete Institute, Farmington Hills, MI.
AISC	<i>Steel Construction Manual</i> , 15th edition, American Institute of Steel Construction, Chicago, IL.
AISC	<i>Seismic Design Manual</i> , 3rd edition, American Institute of Steel Construction, Chicago, IL.
AISI S100	<i>North American Specification for the Design of Cold-Formed Steel Structural Members</i> , 2016 edition, with AISI S240-15 and AISI S400-15/S1-16, American Iron and Steel Institute, Washington, DC.
NDS	<i>National Design Specification for Wood Construction with NDS Supplement: Design Values for Wood Construction</i> , 2018 edition, American Wood Council, Leesburg, VA.
NDS	<i>Special Design Provisions for Wind and Seismic</i> , 2015 edition, American Wood Council, Leesburg, VA.
TMS 402/602	<i>Building Code Requirements and Specification for Masonry Structures</i> , 2016 edition, The Masonry Society, Longmont, CO.