

KCS 11 10 05 : 2019

# General of Geotechnical Work

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KC CODE



국토교통부



# Foreword

- To address needs caused by changes in the construction standard code system, the overlaps and conflicts between existing construction standards (design standard, standard specification) were compared and reviewed and then integrated into the newly enacted Construction Standard Code.
- This code was enacted as a code with reference to the existing Road Work Standard Specification, Tunnel Standard Specification and Utility Tunnel Standard Specification in regard to general geotechnical work. Major matters related to the enactment and revision of this code are as follows:

Construction Standard	Main Content	Enacted or Revised (Year.Month)
Road Work Standard Specification	• Enacted by the Ministry of Construction, by entrusting to the Korean Society of Civil Engineering	Enactment (1967.12)
Road Work Standard Specification	• All specifications and guidelines being used were reviewed for correlations, and revised and improved to prepare specifications for general road works.	Revision (1985.12)
Road Work Standard Specification	• Compensated and revised to prepare a more detailed specification by introducing new theories to all specifications and guidelines being used.	Revision (1990.5)
Road Work Standard Specification	• Revised to improve road work quality and increase international competitiveness by modifying the systems in response to the opening of the construction market followed by the initiation of the WTO system.	Revision (1996.7)
Road Work Standard Specification	• Reconstructed and compensated according to construction standard maintenance guidelines to reflect the revision of other standards including Korean Industrial Standards (KS) and Concrete Standard Specification, and to establish the system as a national specification.	Revision (2003.11)
Road Work Standard Specification	• Revised to address problems found in road work procedures, to harmonize with other standards, including Korean Industrial Standards (KS), Concrete Standard Specification, and Tunnel Standard Specification, to prevent faulty construction works, and to induce solid construction works through thorough quality control.	Revision (2009.3)

Construction Standard	Main Content	Enacted or Revised (Year.Month)
Road Work Standard Specification	<ul style="list-style-type: none"> <li>Revised to change the sequence of standard specification, specialized specification, and design drawings, and to reflect the opinions of the Central Construction Technology Deliberation Committee.</li> </ul>	Revision (2015.9)
Road Work Standard Specification	<ul style="list-style-type: none"> <li>Partially revised in general matters, tree protection materials, general construction works, etc.</li> </ul>	Revision (2016.5)
Tunnel Construction Standard Specification and Explanation	<ul style="list-style-type: none"> <li>General design methods and standards related to survey, design, and construction works for tunnels constructed on mountainous areas</li> </ul>	Enactment (1975.3)
Tunnel Construction Standard Specification	<ul style="list-style-type: none"> <li>Route plan and construction plan added to Survey section</li> <li>Main text and explanation for load and timbering added to Design section</li> <li>Safe hygiene and mechanical excavation added to Construction section</li> <li>Modernization of construction methods and styles</li> <li>Inclined shaft and vertical shaft newly added</li> <li>Standards of NATM method newly added</li> </ul>	Revision (1985.12)
Tunnel Standard Specification	<ul style="list-style-type: none"> <li>Revised as a general specification; explanation omitted</li> <li>Korean terms and writing style applied</li> </ul>	Revision (1996.5)
Tunnel Standard Specification	<ul style="list-style-type: none"> <li>Tunnel design standard and tunnel standard specification separated, rearranged, and supplemented</li> </ul>	Revision (1999.4)
Tunnel Standard Specification	<ul style="list-style-type: none"> <li>Latest design and construction technologies and new materials updated</li> <li>Standards compensated for environment-friendly tunnel construction</li> <li>Construction management reinforced to prevent disasters including tunnel collapse during construction</li> </ul>	Revision (2009.1)
Tunnel Standard Specification	<ul style="list-style-type: none"> <li>Technologies updated to improve technological advancement and environment-friendliness, and secure quality</li> <li>Prevention of collapse at excavation sites and social issues reflected</li> <li>Correction of conflicts with other standards</li> <li>Research accomplishments updated and relevant civil complaints resolved</li> </ul>	Revision (2015.2)
KCS 11 10 05 : 2016	<ul style="list-style-type: none"> <li>Integrated and maintained as code according to changes in the construction standard code system.</li> </ul>	Enactment (June, 2016)

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## 1. General

### 1.1 Scope of Application

- (1) This code provides principles and general rules for geotechnical work on the basis of KDS 11 00 00. This code is intended to be applied to geotechnical aspects of civil engineering works, such as earthwork, soft ground improvement, foundations, anchors, retaining walls, slopes, excavated wall, and excavation works performed for the construction of roads, railways, dams, rivers, bridges, tunnels, breakwaters, bank protection, as well as auxiliary facilities (complexes, water pipes and sewage, landscaping works, etc.)
- (2) This code provides the requirements of the materials, construction, and the quality of geotechnical work during the execution of geotechnical aspects of civil engineering works.
- (3) The construction specification for geotechnical works shall be prepared in accordance with this present specification. However, additions and revisions to the Specifications may be allowed to cover conditions peculiar to an individual project.
- (4) In cases where the current specification is different from a site-specific specification associated with an individual project, worksite-specific specification shall prevail.
- (5) If there is a conflict between design documents, the document will prevail in the following order:
  - ① Contract
  - ② General and special conditions of the contract
  - ③ Construction specification
  - ④ Design drawings
  - ⑤ Standard specification and special provision
  - ⑥ Bidding statement
- (6) If the design documents including the present specification are different from the regulations specified in the relevant laws and standards, the contracting parties should first conform to the regulations specified in the relevant laws and criteria. The following laws and specifications may be referred to:
  - ① Relevant laws and regulations  
The relevant laws and regulations are specified in KDS 10 10 00(4).
  - ② Relevant specifications  
KDS 11 00 00 Geotechnical Design Standard  
KCS 11 00 00 Earthwork  
KCS 21 00 00 Temporary Construction Work  
KCS 24 00 00 Bridge Construction Work  
KCS 44 00 00 Roadwork  
KCS 47 00 00 Railway Construction Work

## 1.2 Definition of terms

- **Earthwork:** Earthwork is as associated with ground-forming work of earth for the construction of a structure or a facility on a natural topography, including excavating of all types, backfilling, filling, compacting, grading and related work.
- **Ground improvement work:** Ground improvement work is as associated with the construction works that improves the engineering properties of soil mass treated enough to be able to support an upper structure with ensuring the stability against bearing capacity and settlement to be constructed thereupon.
- **Foundation work:** Foundation work is as associated with the construction work of shallow and deep foundations that anchor a structure and transfer loads from the structure to the ground.
- **Anchor work:** Anchor work is as associated with the construction work of a device installed to support structures by transmitting a tensile force to a load-resisting formation of soil or rock. An anchor is used to support excavation, earth retaining wall structures, dams, hydrostatic uplift loads, and foundations and to provide slope stabilization,.
- **Retaining wall work:** Retaining wall work is as associated with the wall construction which retain soil and/or rock. Retaining walls are used to accommodate changes in grade, provide increases in right-of-way and buttress the toe of slopes typically consisting of reinforced concrete, reinforced earth, gabion wall, and masonry wall.
- **Slope construction:** Slope construction is associated with the construction work of the slope ensuring the stability against potential movement. The construction includes cut and fill potentially adding anchors, nails, retaining walls, and drainage for the slope stabilization.
- **Excavation work:** Excavation work is as associated with the construction work to remove materials for the placement of foundations, substructures, units, approach slabs, transition slabs and culverts, including the disposal of surplus and unsuitable material.
- **Temporary excavation support work:** Temporary excavation support work is as associated with the construction of excavation supports and temporary earth-retaining structures that keep the sides of excavations stable with ensuring adjacent ground movements less than those causing damage to neighboring structures. **Steel sheet pile:** A steel sheet pile refers to a pile that is pressed or molded from sheet metal so as to interlock with other such piles to form a retaining wall providing the retention of earth and water. **Strut:** A strut is a bracing member for excavation walls either installed in the horizontal planes across the excavation or slopped gently into the excavation depending on the size of the excavation. **Bench:** Bench refers to a long, relatively narrow strip of relatively level or gently inclined land that is bounded by distinctly steeper slopes above and below it.
- **Rock bolt:** A rock bolt refers to a steel or fiberglass rod inserted in a hole drilled into rock to stabilize rock excavations.
- **Soil nailing:** A soil nail refers to grouted, tension-resisting, but passive reinforcement (i.e., no



post-tensioning) installed to reinforce the soil creating a gravity retaining wall for permanent or temporary excavation support.

- Solider pile (or soldier beam): A solider pile refers to H-pile, a structural beam that is dimensionally square installed around the periphery of an excavation. As the excavation proceeds, horizontal sheeting is inserted behind the H-pile flanges forming an excavation wall support resisting earth pressures behind the wall.
- Ground anchor: A ground anchor refers to a load transfer system designed to transfer the forces applied to it to a competent stratum. A ground anchor consists of cables or rods connected to a bearing plate. Ground anchors are divided into permanent anchors and temporary anchors.
- Diaphragm wall: A diaphragm wall refers to a structurally reinforced concrete wall constructed in a deep trench excavation, either cast in situ or using precast concrete components. When made in situ, the trench is prevented from collapsing during excavation, reinforcing, and casting by the use of a drilling fluid, usually a bentonite slurry.
- Trench wall: Trench wall refers to a wall constructed to support excavations for utility tunnel by properly and substantially sheeted, braced, and shored by means of shoring, bracing, sheet piling or cages, as necessary, to prevent failing, slipping or caving in of the trenches. Open cut trench method: Open cut trench method refers to a trench excavated down to either install a new or repair the existing pipes, conduits, or utility tunnels and then backfilled.
- Utility tunnel: A utility tunnel refers to the utility tunnel specified in Article 2, Paragraph 9 of the National Land Planning and Utilization Act, and is a facility installed underground to improve the urban appearance, conserve the road structure, and ensure smooth traffic flows by jointly accommodating underground utilities.

### 1.3 Reveiw of design documents

- (1) The contractor should thoroughly review design documents before the commencement of construction works to avoid potentially incorrect implementation or delay of the construction works due to errors or omissions in the design documents.
- (2) After reviewing the design documents, in any of the following cases, Superintendent should provide the Owner/Client with an review document indicating any of the following cases, and should not commence the construction work until the interpretation or instruction is given from the Owner/Client.
  - ① Reason to modify the design
  - ② Consiliation is required
  - ③ Construction cannot be performed according to the design documents
  - ④ Construction due date needs to be extended
  - ⑤ Any other problem are expected during or after the construction

## 2. Materials

- (1) Materials for construction works that satisfy KS quality standards and that are as environment-friendly as possible should be selected for utilization.
- (2) Of the various materials that are not specified in KS, those that have passed the quality and performance tests required for the design of the structures and facilities should be selected for utilization.

